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ABSTRACT

The report reviews current status of coal mining technology training in postsecondary educational institutions throughout the United States. Each identified institution offering coal mining training was sent a survey designed to obtain information on the size and scope of its program. The survey data are presented. Sections of the report also present curricula information from institutions offering coal mining training, a statement of the task force's philosophy in undertaking the survey, a statement of objectives, and an appendix containing an exerpt dealing with the development of coal mining curricula. (RE)

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COAL TASK FORCE REPORT

ON

EDUCATION AND TRAINING

BEST COPY AVAILABLE

U S DEPARTMENT OF HEALTH, EDUCATION & WELFARE
NATIONAL INSTITUTE OF EDUCATION

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January 15-17, 1979

NOTE: The final Task Force Report can be obtained, when completed, by writing or calling Education Programs Division, DOE, 202/252-6482.

SE 027 934

January, 1979

Dear Reader:

The Department of Energy, Office of Education, Business and Labor Affairs' Coal Task Force members have endeavored to compile a report reviewing the current status of coal mining technology training in educational institutions throughout the United States. Higher education participation was voluntary; therefore, not all schools are included in the report. This report should be read with the clear understanding that the task force is not endorsing the programs contained herein and has not in any way made editorial comments concerning the quality or relevance of any enclosed information.

The information in the report was presented to the task force in many different forms. The task force has attempted to provide some uniformity to the information. This necessitated some structural changes which hopefully has not altered the quality of the inforamtion, nor misrepresented the programs of the various institutions.

I take this opportunity to thank the task force members for their participation in this informational reporting effort. On behalf of the task force and the Department of Energy, I express appreciation to the institutions which supported this effort through the voluntary submission of the enclosed information.

Sincerely,

John Gwaltney

John Gwaltney
President

JG:glk

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COAL TASK FORCE OBJECTIVES

COAL TASK FORCE OBJECTIVES

To survey the current status of post-secondary coal mining technology education.

To develop a publication designed to present current information and statistics to assist in the establishment and coordination of coal mining curricula.

PHILOSOPHICAL STATEMENT

Coal mining education programs should be designed to insure that all training places high priority on safe and efficient methods and procedures. To achieve this goal, it will be necessary for a training program to have constant input from a coal mining advisory council committed to the principle that the miner is the most important resource of the industry. The miner's health and safety should receive the utmost attention in the design and administration of any mining program.

A coal mining advisory council should consist of representatives of labor, management, and government. The members of the advisory council should be instructed as to their responsibilities and should work closely with the administrator of the mining program.

SURVEY INFORMATION

Each identified institution offering coal mining training was sent a survey designed to obtain information about the size and scope of its program. The surveys which were returned are being included in the report without comment.

The colleges and institutions which have taken part in the survey are:

Admiral Peary Area Vocational-Technical School
Ebensburg, Pennsylvania

Beckley College
Beckley, West Virginia

Belmont Technical College
Saint Clairsville, Ohio

Boone Career Center
Danville, West Virginia

Casper College
Casper, Wyoming

College of Eastern Utah
Price, Utah

Colorado Mountain College; East Campus
Leadville, Colorado

Colorado Mountain College; West Campus
Glenwood Springs, Colorado

Fairmont State College
Fairmont, West Virginia

Hazard State Vocational-Technical School
Hazard, Kentucky

Indiana Vocational-Technical College
Terre Haute, Indiana

University of Kentucky
Southeast Community College
Cumberland, Kentucky

Lees Junior College
Jackson, Kentucky

Madisonville Community College
University Drive
Madisonville, Kentucky

Madisonville State Vocational-Technical School
Madisonville, Kentucky

Morehead State University
Morehead, Kentucky

Mountain Empire Community College
Big Stone Gap, Virginia

Pennsylvania State University
University Park, Pennsylvania
Fayette Campus, Uniontown, Pennsylvania
Altoona Campus, Altoona, Pennsylvania
New Kensington Campus,
New Kensington, Pennsylvania

Rend Lake College
Ina, Illinois

Sheridan College
Sherida, Wyoming

Southeastern Illinois College
Harrisburg, Illinois

Southwest Virginia Community College
Richlands, Virginia

Wabash Valley College
Mt. Carmel, Illinois

West Virginia Institute of Technology
Montgomery, West Virginia

Ralph R. Willis Vocational Center
Logan, West Virginia

NATIONAL ENERGY EDUCATION BUSINESS AND LABOR CONFERENCE
COAL SURVEY COMPONENT

1. Name of the training institution Admiral Peary Area Vocational-Technical School

Route 422 West R.D. #2 - Ebensburg, Pennsylvania
Address

2. Type of training institution: Private __ Public X Two-Year __ Four-Year __

3. Number of years your institution has been in mining training: 1 2 3 4 5 6 7 (8) 9 10 ___

4. Type of degree your institution grants in mining: Certificate, one-year or less X

Two-year ~~Associate~~ Certificate Degree X Four-year Bachelor of Science Degree __ Management Training __

Technical Training X Engineering Training __ Surface __ Underground X

5. Number of students your institution has had, now has, and will have in your best judgment. (List students by FTE) ↑ in (mining or mine related areas using task analysis) (not total student body which averages 820 secondary and 900 adult)

UNDERGROUND TRAINING	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	198
Non-degree/non-certificate program 1 & 2 years				60	65	80	92	87	100	110	110	100	120	140
Certificate, one-year or less														
Two-year A.S. Degree														
Four-year B.S. Degree														
SURFACE TRAINING														
Non-degree/non-certificate program														
Certificate, one-year or less														
Two-year A.S. Degree														
Four-year B.S. Degree														

6. Placement information on graduates:

A. The number of graduates from your program averages 100 per year
B. The per cent placed in the mining industry 70%
C. The per cent which are placed in related industry 20%

Remarks on where the graduates not employed in the mining industry or a related industry are:

Armed service, moved from area.

7. Instructor qualifications:

A. Number of instructors employed 6 (full-time) 15 (adjunct faculty)

B. Ratio of students to instructors is 10 to one

C. Instructor qualifications:
Please list all instructors full or part-time and please do not list instructors by name.
Please include adjunct faculty teaching one credit hour or more.

	Years of mining experience	Type of employment in mines	Type of federal/state certification	Years of higher educati training
1	20	most areas of underground	electrical, underground surface, instructor of instructors, mechanical	5
2	9	most areas of underground	electrical, new miner training, underground mechanical	3
3	6	most areas of underground	new miner training, electrical	4
4	8	most areas of underground	new miner training	3
5	10	most areas of underground	new miner training	4
6	4	most areas of underground	new miner	3
7	14	all areas including super-vision	electrical new miner training, surface miner training, mechanical	average 2 years
8				

8. Program Cost:

A. Total capital investment in your program, buildings, equipment, A.V. equipment, etc. for mining and related areas only, $300,000.00 (not including donations of equipment)

B. Unit cost per student: semester hr. (see explanation below)*
quarter hr. _____

REMARKS:

*Federal and State aid - $32 for each 60 hours of instruction
Tuition - $20 for each 60 hours of instruction (adult)
Supplies - $15 for each 60 hours of instruction (adult)

Adult total - $67 for each 60 hours of instruction
Secondary - $1,100 per student for 540 clock hours

NATIONAL ENERGY EDUCATION BUSINESS AND LABOR CONFERENCE
COAL SURVEY COMPONENT

1. Name of the training institution Beckley College

Beckley, WV 25801
Address

2. Type of training institution: Private X Public __ Two-Year X Four-Year __

3. Number of years your institution has been in mining training: 1 2 3 (4) 5 6 7 8 9 10 ___

4. Type of degree your institution grants in mining: Certificate, one-year or less __

Two-year Associate Science Degree X Four-year Bachelor of Science Degree __ Management Training __

Technical Training __ Engineering Training __ Surface __ Underground __

5. Number of students your institution has had, now has, and will have in your best judgment. (List students by FTE)

	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	198
UNDERGROUND TRAINING														
Non-degree/non-certificate program														
Certificate, one-year or less														
Two-year A.S. Degree								30	75	220	230	245	260	275
Four-year B.S. Degree														
SURFACE TRAINING														
Non-degree/non-certificate program														
Certificate, one-year or less														
Two-year A.S. Degree														
Four-year B.S. Degree														

6. Placement information on graduates:

A. The number of graduates from your program 14
B. The per cent placed in the mining industry 86%
C. The per cent which are placed in related industry 14%

Remarks on where the graduates not employed in the mining industry or a related industry are:

Some of the graduates decided to change their major and return to college

7. Instructor qualifications:

A. Number of instructors employed 1 (full-time) 11 (adjunct faculty)

B. Ratio of students to instructors is 19 to one

C. Instructor qualifications:
Please list all instructors full or part-time and please do not list instructors by name.
Please include adjunct faculty teaching one credit hour or more.

	Years of mining experience	Type of employment in mines	Type of federal/state certification	Years of higher educatio training
1	15	Instructor	State/Federal	4
2	21	"	" "	4
3	0	N/A	N/A	4
4	0	"	"	4
5	1	Instructor	State	4
6	4	N/A	"	4
7	2	Instructor	"	3
8	1	"	State/Federal	2
9	5	Draftsman	" "	2
10	8	Instructor	" "	2
11	11	Foreman	" "	1
12	0	Instructor	N/A	1

8. Program Cost:

A. Total capital investment in your program, buildings, equipment, A.V. equipment, etc.

$181,000

B. Unit cost per student: semester hr. 32.00

quarter hr.

REMARKS:

NATIONAL ENERGY EDUCATION BUSINESS AND LABOR CONFERENCE
COAL SURVEY COMPONENT

1. Name of the training institution Belmont Technical College

I-70, State Route 331, Saint Clairsville, OH 43950
Address

2. Type of training institution: Private __ Public X Two-Year X Four-Year __

3. Number of years your institution has been in mining training: 1 2 3 4 5 6 7 8 9 10 7

4. Type of degree your institution grants in mining: Certificate, one-year or less __

Two-year Associate Science Degree X Four-year Bachelor of Science Degree __ Management Training __

Technical Training __ Engineering Training __ Surface X Underground X

5. Number of students your institution has had, now has, and will have in your best judgment. (List students by FTE)

UNDERGROUND TRAINING	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981
Non-degree/non-certificate program														
Certificate, one-year or less														
Two-year A.S. Degree						33	39	47	45	42	52	40	40	40
Four-year B.S. Degree														

SURFACE TRAINING														
Non-degree/non-certificate program														
Certificate, one-year or less														
Two-year A.S. Degree						29	35	35	27	14	15	14	14	15
Four-year B.S. Degree														

6. Placement information on graduates:

A. The number of graduates from your program 83
B. The per cent placed in the mining industry 80
C. The per cent which are placed in related industry 15

Remarks on where the graduates not employed in the mining industry or a related industry are:

7. Instructor qualifications:

A. Number of instructors employed 1 (full-time) 5 (adjunct faculty)

B. Ratio of students to instructors is 10 to one

C. Instructor qualifications:
Please list all instructors full or part-time and please do not list instructors by name.
Please include adjunct faculty teaching one credit hour or more.

	Years of mining experience	Type of employment in mines	Type of federal/state certification	Years of higher education training
1	3	Supervisor Mining Engineer	Foreman Certificate Professional Eng. Cert.	MS-3 BS-4
2	40	Superintendent Mining Engineer	Retired (India) Professional Eng. Cert.	BS-4
3	45	Safety Supervisor	Retired	3
4	3	Supervisor	Foreman Certificate Professional Eng. Cert.	MS-1 BS-4
5	10	Supervisor Mining Engineer	Foreman Certificate Professional Eng. Cert	MS-1 BS-4
6	8	Manager of Exploration	Professional Geologist	MS-2 BS-4
7				
8				

8. Program Cost:

A. Total capital investment in your program, buildings, equipment, A.V. equipment, etc.

_____

B. Unit cost per student: semester hr. _____
quarter hr. _____

REMARKS:

NATIONAL ENERGY EDUCATION BUSINESS AND LABOR CONFERENCE
COAL SURVEY COMPONENT

1. Name of the training institution Boone Career Center

Danville, West Virginia
Address

2. Type of training institution: Private __ Public X Two-Year X Four-Year __

3. Number of years your institution has been in mining training: 1 2 (3) 4 5 6 7 8 9 10 ___

4. Type of degree your institution grants in mining: Certificate, one-year or less X

Two-year Associate Science Degree __ Four-year Bachelor of Science Degree __ Management Training __

Technical Training X Engineering Training __ Surface X Underground X

5. Number of students your institution has had, now has, and will have in your best judgment. (List students by FTE)

UNDERGROUND TRAINING

	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	198
Non-degree/non-certificate program	N/A	N/A	N/A	N/A	N/A	N/A	N/A	376	551	628	580	500	600	630
Certificate, one-year or less														
Two-year A.S. Degree														
Four-year B.S. Degree														

SURFACE TRAINING

Non-degree/non-certificate program	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	100	356	400	450	480
Certificate, one-year or less														
Two-year A.S. Degree														
Four-year B.S. Degree														

6. Placement information on graduates:

A. The number of graduates from your program 243
B. The per cent placed in the mining industry 60%
C. The per cent which are placed in related industry 5%

Remarks on where the graduates not employed in the mining industry or a related industry are:

7. Instructor qualifications:

A. Number of instructors employed 15 (full-time) _____ (adjunct faculty)

B. Ratio of students to instructors is 15 to one

C. Instructor qualifications:
Please list all instructors full or part-time and please do not list instructors by name.
Please include adjunct faculty teaching one credit hour or more.

	Years of mining experience	Type of employment in mines	Type of federal/state certification	Years of higher educatic training
1	25	fire boss, foreman, miner supt. surface & underground		3
2	9	miner, foreman, electronics	MESA, State	2
3	9	miner, fire boss, foreman	MESA, State	4
4	10	heavy equipment repair	State vocational	1
5	10	power mechanics heavy equipment repair	State vocational	4
6	12	equipment operator hydraulics	State vocational	2
7	10	welder, miner, electrician	State vocational	3
8	20 in related 0 in mines	welder, mechanics, electrician	State vocational	2

8. Program Cost:

A. Total capital investment in your program, buildings, equipment, A.V. equipment, etc.

$2,000,000

B. Unit cost per student: semester hr. _____
quarter hr. _____

REMARKS:

NATIONAL ENERGY EDUCATION BUSINESS AND LABOR CONFERENCE
COAL SURVEY COMPONENT

1. Name of the training institution CASPER COLLEGE

Casper, Wyoming 82601
Address

2. Type of training institution: Private __ Public X Two-Year X Four-Year __

3. Number of years your institution has been in mining training: 1 2 3 4½5 6 7 8 9 10 ___

4. Type of degree your institution grants in mining: Certificate, one-year or less __

Two-year Associate Science Degree X Four-year Bachelor of Science Degree __ Management Training __

Technical Training X Engineering Training __ Surface X Underground __

5. Number of students your institution has had, now has, and will have in your best judgment. (List students by FTE) Between the first group beginning in 1973, and the present, approximately 165 have entered the program. 143 have graduated, the balance dropped out of the program. We anticipate approximately 50 new students entering the program per school year.

UNDERGROUND TRAINING	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981
Non-degree/non-certificate program														
Certificate, one-year or less														
Two-year A.S. Degree														
Four-year B.S. Degree														

SURFACE TRAINING														
Non-degree/non-certificate program														
Certificate, one-year or less														
Two-year A.S. Degree								23	8	67	45			
Four-year B.S. Degree														

6. Placement information on graduates:

A. The number of graduates from your program 143
B. The per cent placed in the mining industry 93%
C. The per cent which are placed in related industry 2%

Remarks on where the graduates not employed in the mining industry or a related industry are:

Those not placed in mining or related industries were either not recommended for employment, or the student sought employment elsewhere.

7. Instructor qualifications:

A. Number of instructors employed ** 8 (full-time) 12 (adjunct faculty)
**NOTE: These instructors have primary responsibilities in the mining area.
B. Ratio of students to instructors is 12-16 to one (in lab classes, 30-32:1 in lectures classes)

C. Instructor qualifications: See "Remarks" for additional DATA.
Please list all instructors full or part-time and please do not list instructors by name.
Please include adjunct faculty teaching one credit hour or more.

	Years of mining experience (Major Area of Instruction)	Type of employment in mines	Type of federal/state certification	Years of higher education training
1	Welding/Machine Shop Mine Safety	*See Note Below	M.S.H.A.	Masters Degree Plus
2	Mechanics, Hydraulics, Pneumatics, Ind. Safety	*See Note Below	M.S.H.A.	Bachelors Degree Plus
3	Mechanics, Hydraulics Surface Mine Mobile Equip.	*See Note Below		Masters Degree Plus
4	Electricity, Electronics & Surface Mine Operations	Electrical Instructor-3 yrs.	M.S.H.A.	Educational Doctorate
5	Welding/Machine Shop	*See Note Below		Bachelors Degree Plus
6	Electricity/Electronics	*See Note Below	M.S.H.A.	Bachelors Degree Plus
7	Electricity/Electronics	*See Note Below	M.S.H.A. P.E.	Masters Degree Plus
8	Drafting/Mine Safety	*See Note Below	M.S.H.A.	Masters Degree Plus

*All instructors are trade experienced in the specific area of their instruction. They are also graduates of industry service training programs.

*** No State Certification required for community college instructors.

8. Program Cost:

A. Total capital investment in your program, buildings, equipment, A.V. equipment, etc.

$485,000.00 Approximate based upon figures in "Remarks"

B. Unit cost per student: semester hr. $13.00 in-state $40.00 for out-of-state
quarter hr.

REMARKS:

PROGRAM COST:

Buildings -- Based upon percentage of space use $200,000.00.

Electrical -- $60,000.00

Mechanical -- $150,000.00

Welding -- $75,000.00

Instructional Staff:

All instructional staff at Casper College are qualified in their area of instruction. Students enrolled in the program are assigned classes with other college students in the academic areas. Mining Technology classes are reserved for mining students.

NATIONAL ENERGY EDUCATION BUSINESS AND LABOR CONFERENCE
COAL SURVEY COMPONENT

1. Name of the training institution College of Eastern Utah

Price, Utah 84501
Address

2. Type of training institution: Private __ Public XX Two-Year XX Four-Year __

3. Number of years your institution has been in mining training: 1 2 3 4 /5/ 6 7 8 9 10 ___

4. Type of degree your institution grants in mining: Certificate, one-year or less XX

Two-year Associate Science Degree XX Four-year Bachelor of Science Degree __ Management Training XX

Technical Training XX Engineering Training __ Surface __ Underground XX

5. Number of students your institution has had, now has, and will have in your best judgment. (List students by FTE)

UNDERGROUND TRAINING	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	19
Non-degree/non-certificate program							206	564	652	572				
Certificate, one-year or less							48	95	78	62				
Two-year A.S. Degree							8	30	14	26				
Four-year B.S. Degree														
SURFACE TRAINING														
Non-degree/non-certificate program														
Certificate, one-year or less														
Two-year A.S. Degree														
Four-year B.S. Degree														

6. Placement information on graduates:

A. The number of graduates from your program 12 (2 yr. Associate 3200 total non degree included)
B. The per cent placed in the mining industry 90%
C. The per cent which are placed in related industry 5%

Remarks on where the graduates not employed in the mining industry or a related industry are:

Unemployable or dislike area and leave or find suitable employment in totally unrelated areas after training.

7. Instructor qualifications:

A. Number of instructors employed 7 (full-time) 30 (adjunct faculty)

B. Ratio of students to instructors is 16 to one

C. Instructor qualifications:
Please list all instructors full or part-time and please do not list instructors by name.
Please include adjunct faculty teaching one credit hour or more.

	Years of mining experience	Type of employment in mines	Type of federal/state certification	Years of higher educatio training
1	2	Labor-Management (Engineering)	All MSHA Teaching	4
2	8	Labor	All MSHA-Fireboss/Foreman	2
3	9	Labor, Mechanic, Elect., Supervisor	Electrical, Fireboss, Foreman	4
4	2	Technical Assis.	Electrical	3
5	3	Labor, Technical	All MSHA, Fireboss	6
6	2	Labor	All MSHA	4
7	0	n/a	Teachers Certificate	6
8				

8. Program Cost:

A. Total capital investment in your program, buildings, equipment, A.V. equipment, etc.

$2.5 million

B. Unit cost per student: semester hr. $200
quarter hr.

REMARKS:

NATIONAL ENERGY EDUCATION BUSINESS AND LABOR CONFERENCE
COAL SURVEY COMPONENT

1. Name of the training institution Colorado Mountain College

East Campus; Leadville, Colorado 80461
Address

NOTE: This program deals with land reclamation at mines, not coal extraction per se.

2. Type of training institution: Private __ Public X Two-Year X Four-Year __

3. Number of years your institution has been in mining training: 1 2 3 4 (5) 6 7 8 9 10 ___

4. Type of degree your institution grants in mining: Certificate, one-year or less __

Two-year Associate Science Degree X Four-year Bachelor of Science Degree __ Management Training __

Technical Training X Engineering Training __ Surface X Underground __

5. Number of students your institution has had, now has, and will have in your best judgment. (List students by FTE)

	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	198
UNDERGROUND TRAINING														
Non-degree/non-certificate program														
Certificate, one-year or less														
Two-year A.S. Degree														
Four-year B.S. Degree														
SURFACE TRAINING														
Non-degree/non-certificate program														
Certificate, one-year or less													5	8
Two-year A.S. Degree							8	13	17	23	27	30	35	38
Four-year B.S. Degree														

6. Placement information on graduates:

A. The number of graduates from your program 23
B. The per cent placed in the mining industry 89
C. The per cent which are placed in related industry 3

Remarks on where the graduates not employed in the mining industry or a related industry are:

married (females); on to four-year programs; environmental "purists" who couldn't fit into the industry concept or philosophy; changed career plans.

7. Instructor qualifications:

A. Number of instructors employed 1 (full-time) 4 (adjunct faculty)

B. Ratio of students to instructors is 15 to one

C. Instructor qualifications:
Please list all instructors full or part-time and please do not list instructors by name.
Please include adjunct faculty teaching one credit hour or more.

	Years of mining/reclamation experience	Type of employment at mines	Type of federal/state certification	Years of higher education training
1	6	plants, soils, water, revegetation	Colorado Vocational Credential	6
2	1	none at mine -- laboratory work	None	6
3	4	surveying; residue and tailings	Colorado Vocational Credential	5
4	2	water quality; revegetation tailings	Colorado Vocational Credential	8
5				
6				
7				
8				

8. Program Cost:

A. Total capital investment in your program, buildings, equipment, A.V. equipment, etc.

$180,000

B. Unit cost per student: semester hr. ---
quarter hr. 42.00

REMARKS:

Please note again that this program deals with land reclamation at mines, not with coal extraction per se. Expansion in 1980 is proposed to train people to work with water quality.

NATIONAL ENERGY EDUCATION BUSINESS AND LABOR CONFERENCE
COAL SURVEY COMPONENT

1. Name of the training institution Colorado Mountain College

West Campus; Glenwood Springs, Colorado 81601
Address

2. Type of training institution: Private __ Public X Two-Year X Four-Year __

3. Number of years your institution has been in mining training: (1) 2 3 4 5 6 7 8 9 10 ____ .

4. Type of degree your institution grants in mining: Certificate, one-year or less X

Two-year Associate Science Degree X Four-year Bachelor of Science Degree __ Management Training __

Technical Training __ Engineering Training __ Surface X Underground X

5. Number of students your institution has had, now has, and will have in your best judgment. (List students by FTE)

UNDERGROUND TRAINING	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	198
Non-degree/non-certificate program											184	208	250	27
Certificate, one-year or less											30	40	40	4
Two-year A.S. Degree														
Four-year B.S. Degree														
SURFACE TRAINING														
Non-degree/non-certificate program											5	10	14	1
Certificate, one-year or less														
Two-year A.S. Degree														
Four-year B.S. Degree														

6. Placement information on graduates:

A. The number of graduates from your program First graduates will complete program in April, 1978.
B. The per cent placed in the mining industry Seven students have dropped; three employed.
C. The per cent which are placed in related industry 0

Remarks on where the graduates not employed in the mining industry or a related industry are:

Four remaining drop-outs are employed in other occupations.

7. Instructor qualifications:

A. Number of instructors employed 4 (full-time) 1 (adjunct faculty)

B. Ratio of students to instructors is 37 to one

C. Instructor qualifications:
Please list all instructors full or part-time and please do not list instructors by name.
Please include adjunct faculty teaching one credit hour or more.

	Years of mining experience	Type of employment in mines	Type of federal/state certification	Years of higher education training
1	10	General laborer and mine electrician	MSHA cooperative instructor - electrica	5
2	1	Underground laborer electrician helper	MSHA cooperative instr Federal First Aid	1
3	8	Mill foreman-underground zinc mine	None	0
4	10	Underground laborer and repair shop supervisor	MESA	2
5				
6				
7				
8				

8. Program Cost:

A. Total capital investment in your program, buildings, equipment, A.V. equipment, etc.

$214,000

B. Unit cost per student: semester hr. _____
quarter hr. $38.50

REMARKS:

NATIONAL ENERGY EDUCATION BUSINESS AND LABOR CONFERENCE
COAL SURVEY COMPONENT

1. Name of the training institution Fairmont State College

Fairmont, WV 26554
Address

2. Type of training institution: Private __ Public X Two-Year X Four-Year X

3. Number of years your institution has been in mining training: 1 2 3 4 5 6 7 8 9 10 ___

4. Type of degree your institution grants in mining: Certificate, one-year or less __

Two-year Associate Science Degree X Four-year Bachelor of Science Degree X Management Training X

Technical Training X Engineering Training __ Surface __ Underground X

5. Number of students your institution has had, now has, and will have in your best judgment. (List students by FTE)

UNDERGROUND TRAINING	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	198
Non-degree/non-certificate program														
Certificate, one-year or less														
Two-year A.S. Degree									45	50	63			
Four-year B.S. Degree										30	33			

SURFACE TRAINING														
Non-degree/non-certificate program														
Certificate, one-year or less														
Two-year A.S. Degree														
Four-year B.S. Degree														

6. Placement information on graduates:

A. The number of graduates from your program 6
B. The per cent placed in the mining industry 100%
C. The per cent which are placed in related industry _____

Remarks on where the graduates not employed in the mining industry or a related industry are:

_____

_____

7. Instructor qualifications:

A. Number of instructors employed 3 (full-time) 2 (adjunct faculty)

B. Ratio of students to instructors is 32 to one

C. Instructor qualifications:
Please list all instructors full or part-time and please do not list instructors by name.
Please include adjunct faculty teaching one credit hour or more.

	Years of mining experience	Type of employment in mines	Type of federal/state certification	Years of higher educatio training
1				
2				
3				
4				
5				
6				
7				
8				

8. Program Cost:

A. Total capital investment in your program, buildings, equipment, A.V. equipment, etc.

_____

B. Unit cost per student: semester hr. _____
quarter hr. _____

Items 7C and 8 not available

NATIONAL ENERGY EDUCATION BUSINESS AND LABOR CONFERENCE
COAL SURVEY COMPONENT

1. Name of the training institution Hazard State Vocational-Technical School
101 Vo-Tech Drive
Hazard, KY 41701
Address

2. Type of training institution: Private __ Public X Two-Year __ Four-Year __

3. Number of years your institution has been in mining training: 1 2 3 4 5 6 7 8 9 10 32

4. Type of degree your institution grants in mining: Certificate, one-year or less X

Two-year Associate Science Degree __ Four-year Bachelor of Science Degree __ Management Training __

Technical Training X Engineering Training X Surface X Underground X

5. Number of students your institution has had, now has, and will have in your best judgment. (List students by FTE)

UNDERGROUND TRAINING

	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	198
Non-degree/non-certificate program	Short	Term	Classes	20	30	60	160	310	360	415	528	800	1000	1200
Certificate, one-year or less	24	24	24	24	24	36	36	36	40	40	42	52	60	70
Two-year A.S. Degree														
Four-year B.S. Degree														

*Open-entry open-exit enrollment.

SURFACE TRAINING

Non-degree/non-certificate program	Short	Term	Classes	10	18	24	120	160	206	240	253	275	400	450
Certificate, one-year or less														
Two-year A.S. Degree														
Four-year B.S. Degree														

6. Placement information on graduates:

A. The number of graduates from your program 400 approximate
B. The per cent placed in the mining industry 86%
C. The per cent which are placed in related industry 10%

Remarks on where the graduates not employed in the mining industry or a related industry are:

State and Federal employment, private trucking industry, unwilling to work

7. Instructor qualifications:

A. Number of instructors employed 3 (full-time) 8 part-time (adjunct faculty)

B. Ratio of students to instructors is 20 to one

C. Instructor qualifications:
Please list all instructors full or part-time and please do not list instructors by name.
Please include adjunct faculty teaching one credit hour or more.

	Years of mining experience	Type of employment in mines	Type of federal/state certification	Years of higher educatio training
1	8	Repair electrical mining equipment	Approved State and Federal Instructor	2 year associate degree
2	5	Repair electrical mining equipment	Approved State and Federal Instructor	2 year associate degree mining technology
3	5	Construction Electrician	qualified mining tech. instructor	2 year associate degree
4				
5				
6				
7				
8				

3. Program Cost:

A. Total capital investment in your program, buildings, equipment, A.V. equipment, etc.

Approximately one million dollars to include all of the above categories.

B. Unit cost per student:

semester hr.	
quarter hr.	
Per year (Tuition, Books, and supplies)	$ 108.00

REMARKS:

The information contained in this survey is estimates based upon interviews with staff who are assigned responsibilities under each category identified in the survey.

NATIONAL ENERGY EDUCATION BUSINESS AND LABOR CONFERENCE
COAL SURVEY COMPONENT

1. Name of the training institution Indiana Vocational Technical College

RR#22, Box 760, Terre Haute, IN 47802
Address

2. Type of training institution: Private __ Public X Two-Year X Four-Year __

3. Number of years your institution has been in mining training: 1 2 3 4 5 6 7 8 9 10 3

4. Type of degree your institution grants in mining: Certificate, one-year or less __

Two-year Associate Science Degree X Four-year Bachelor of Science Degree __ Management Training __

Technical Training __ Engineering Training __ Surface X Underground __

5. Number of students your institution has had, now has, and will have in your best judgment. (List students by FTE)

UNDERGROUND TRAINING	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981
Non-degree/non-certificate program														
Certificate, one-year or less														
Two-year A.S. Degree														
Four-year B.S. Degree														

SURFACE TRAINING														
Non-degree/non-certificate program														
Certificate, one-year or less												100	100	100
Two-year A.S. Degree									45	65	48	50	50	50
Four-year B.S. Degree														

6. Placement information on graduates:

A. The number of graduates from your program 20
B. The per cent placed in the mining industry 99
C. The per cent which are placed in related industry 1

Remarks on where the graduates not employed in the mining industry or a related industry are:

N/A

7. Instructor qualifications:

A. Number of instructors employed 4 (full-time) 4 (adjunct faculty)

B. Ratio of students to instructors is 17 to one

C. Instructor qualifications:
Please list all instructors full or part-time and please do not list instructors by name.
Please include adjunct faculty teaching one credit hour or more.

	Years of mining experience	Type of employment in mines	Type of federal/state certification	Years of higher education training
1	39	Supervision	S	4
2	37	Supervision	S	1
3	12	Supervision	S	0
4	30	Supervision	Waste Waton Operation	4
5	6	None (Rolatod)	S	4
6	2	None (Rolatod)	S	6+
7	3	None (Rolated)	S	4
8	2	Instructon	S	6

8. Program Cost:

A. Total capital investment in your program, buildings, equipment, A.V. equipment, etc.

$300,000

B. Unit cost per student: semester hr. _____
quarter hr. $1.50 Average

REMARKS:

NATIONAL ENERGY EDUCATION BUSINESS AND LABOR CONFERENCE
COAL SURVEY COMPONENT

1 Name of the training institution University of Kentucky, Southeast Community College

Cumberland, KY 40823
Address

2 Type of training institution: Private __ Public __ Two-Year X Four-Year __

3 Number of years your institution has been in mining training: 1 2 3 4 5 6 7 8 9 10 4

4 Type of degree your institution grants in mining: Certificate, one-year or less __

Two-year Associate Science Degree X Four-year Bachelor of Science Degree __ Management Training __

Technical Training __ Engineering Training __ Surface __ Underground __

5 Number of students your institution has had, now has, and will have in your best judgment. (List students by FTE)

UNDERGROUND TRAINING	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981
Non-degree/non-certificate program														
Certificate, one-year or less														
Two-year A.S. Degree							20	40	80	90	110	140	160	200
Four-year B.S. Degree														

SURFACE TRAINING Reclamation														
Non-degree/non-certificate program														
Certificate, one-year or less														
Two-year A.S. Degree									8	10	15	19	25	30
Four-year B.S. Degree														

6. Placement information on graduates:

A. The number of graduates from your program 40
B. The per cent placed in the mining industry 90%
C. The per cent which are placed in related industry 10%

Remarks on where the graduates not employed in the mining industry or a related industry are:

Several graduates entered into Coal Sampling and Analysis at Commercial Testing Labs.

7. Instructor qualifications:

A. Number of instructors employed 15 (full-time) 3 (adjunct faculty)

B. Ratio of students to instructors is 9 to one

C. Instructor qualifications:
Please list all instructors full or part-time and please do not list instructors by name.
Please include adjunct faculty teaching one credit hour or more.

	Years of mining experience	Type of employment in mines	Type of federal/state certification	Years of higher education training
1	6	English	Foreman's Paper	B.S.
2	3½	English	Foreman's Paper	B.S.
3	4	English	Foreman's Paper	B.S.
4	4½	English	Foreman's Paper	B.S.
5	5	English	Foreman's Paper	B.S.
6	3	English	Foreman's Paper	B.S.
7	4	English	Foreman's Paper	B.S.
8	4	English	Foreman's Paper	B.S.

B. Program Cost:

A. Total capital investment in your program, buildings, equipment, A.V. equipment, etc.

8 Million

B. Unit cost per student: semester hr. 17
quarter hr. _____

REMARKS:

NATIONAL ENERGY EDUCATION BUSINESS AND LABOR CONFERENCE
COAL SURVEY COMPONENT

1. Name of the training institution Lees Junior College

Jackson, Kentucky 41339
Address

2. Type of training institution: Private X Public __ Two-Year __ Four-Year __

3. Number of years your institution has been in mining training: 1 2 3 4 5 6 7 8 9 10 3+

4. Type of degree your institution grants in mining: Certificate, one-year or less __

Two-year Associate Science Degree X Four-year Bachelor of Science Degree __ Management Training __

Technical Training __ Engineering Training __ Surface __ Underground __

5. Number of students your institution has had, now has, and will have in your best judgment. (List students by FTE)

	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	19
UNDERGROUND TRAINING														
Non-degree/non-certificate program														
Certificate, one-year or less														
Two-year A.S. Degree												13	18	18
Four-year B.S. Degree														
SURFACE TRAINING														
Non-degree/non-certificate program														
Certificate, one-year or less														
Two-year A.S. Degree								18	25	32	32	22	18	18
Four-year B.S. Degree														

6. Placement information on graduates:

A. The number of graduates from your program 10
B. The per cent placed in the mining industry 80%
C. The per cent which are placed in related industry 10%

Remarks on where the graduates not employed in the mining industry or a related industry are:

One graduate employed in an auto parts business.

7. Instructor qualifications:

A. Number of instructors employed 1 (full-time) 6 (FTE = 1) (adjunct faculty)

B. Ratio of students to instructors is 16 to one

C. Instructor qualifications:
Please list all instructors full or part-time and please do not list instructors by name.
Please include adjunct faculty teaching one credit hour or more.

	Years of mining experience	Type of employment in mines	Type of federal/state certification	Years of higher education training
1	5	Mining Engineer-Exploration	-	8.5
2	5	Engineering	-	4
3	6	Reclamation Supervisor	-	4
4	0	-	-	7.5
5	11	Up to Foreman- Under-ground	Mine Inspector	0
6	0	-	-	6
7	0	-	-	6
8				

8. Program Cost:

A. Total capital investment in your program, buildings, equipment, A.V. equipment, etc.

$ 125,000.

B. Unit cost per student: semester hr. $ 85.
quarter hr. -

REMARKS:

Question 8 -

A. Capital investment includes:
   1. A pro-rated value of a laboratory, two small storage rooms, a classroom and two faculty offices within the $750,000 (replacement value) Library/Science building.
   2. Capitalized equipment, e.g., surveying instruments, laboratory equipment, van for field trips, etc.

B. Unit cost per student includes instructional costs only; it does not include college administration, maintenance, student services, etc

NATIONAL ENERGY EDUCATION BUSINESS AND LABOR CONFERENCE
COAL SURVEY COMPONENT

1. Name of the training institution Madisonville Community College

University Drive, Madisonville, Kentucky 42431
Address

2. Type of training institution: Private __ Public __ Two-Year X Four-Year __

3. Number of years your institution has been in mining training: 1 2 3 4 (5) 6 7 8 9 10 ___

4. Type of degree your institution grants in mining: Certificate, one-year or less __

Two-year Associate Science Degree X Four-year Bachelor of Science Degree __ Management Training X

Technical Training X Engineering Training __ Surface X Underground X

5. Number of students your institution has had, now has, and will have in your best judgment. (List students by FTE)

UNDERGROUND TRAINING	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	198
Non-degree/non-certificate program														
Certificate, one-year or less														
Two-year A.S. Degree	mining & reclamation students						69	278	368	267	218			
Four-year B.S. Degree														

SURFACE TRAINING														
Non-degree/non-certificate program														
Certificate, one-year or less														
Two-year A.S. Degree	surface and reclamation						25	118	173	189	195			
Four-year B.S. Degree														

6. Placement information on graduates:

A. The number of graduates from your program 104 (62 mining and 42 reclamation)
B. The per cent placed in the mining industry 95%
C. The per cent which are placed in related industry 4%

Remarks on where the graduates not employed in the mining industry or a related industry are:

We have some graduates that go on to a four year institution. We also have some students employed before graduation in a non-related field that have not yet changed to a mine related occupation.

7. Instructor qualifications:

A. Number of instructors employed 5 (full-time) 8 (adjunct faculty)

B. Ratio of students to instructors is 7 to one

C. Instructor qualifications:
Please list all instructors full or part-time and please do not list instructors by name.
Please include adjunct faculty teaching one credit hour or more.

	Years of mining experience	Type of employment in mines	Type of federal/state certification	Years of higher educati training
1	4 years of experience	Surface foreman	Foreman's certificate and blasters	B.A. Degree
2	2 years of experience	Underground foreman	Foreman's certificate and MSHA	M.S. Degree
3	2 years of experience	Geologist		M.S. Degree
4	1 year of experience	Engineer		B.A.Engineers Degree
5	2 years of experience	Forester		M.S. Degree
6	2 years of experience	Underground foreman	Foreman's Certicate	Mechanical Engineer Degr
7	8 years of experience	Underground and surface	Safety certificate	M.S. Degree
8	2 years of experience	- - - - - - - - - -	State engineer	M.S. Degree

8. Program Cost:

A. Total capital investment in your program, buildings, equipment, A.V. equipment, etc.

_____

B. Unit cost per student: semester hr. $17/hour
quarter hr. _____

REMARKS:

At this time we are unable to give an accurate capital investment due to an addition to our building for mining expansion. We are adding a third floor to our building to expand our mining and reclamation projects and programs. Enrollment has increased as well as industry demands. We are in the process of purchasing the latest equipment for quality instruction.

NATIONAL ENERGY EDUCATION BUSINESS AND LABOR CONFERENCE
COAL SURVEY COMPONENT

1. Name of the training institution Madisonville State Voc.-Technical School
637 West Center, Madisonville, KY 42431
Address

2. Type of training institution: Private __ Public X Two-Year X Four-Year __

3. Number of years your institution has been in mining training: 1 2 3 4 5 6(7)8 9 10 __

4. Type of degree your institution grants in mining: Certificate, one-year or less __ 2 yr. diploma

Two-year Associate Science Degree __ Four-year Bachelor of Science Degree __ Management Training __

Technical Training X Engineering Training __ Surface __ Underground X

5. Number of students your institution has had, now has, and will have in your best judgment. (List students by FTE)

	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	198
UNDERGROUND TRAINING														
Non-degree/non-certificate program			23	49	68	92	108	113	112	96	92	115	130	141
Certificate, one-year or less														
Two-year A.S. Degree														
Four-year B.S. Degree														
SURFACE TRAINING														
Non-degree/non-certificate program														
Certificate, one-year or less														
Two-year A.S. Degree														
Four-year B.S. Degree														

B. Program cost:

A. Total capital investment in your program; buildings; equipment; A.V. equipment; etc.
$800,000

B. Unit cost per student: ~~semester hour~~ $600/Yr.
quarter hr.

REMARKS:

NATIONAL ENERGY EDUCATION BUSINESS AND LABOR CONFERENCE
COAL SURVEY COMPONENT

1. Name of the training institution Morehead State University

Morehead, KY 40351
Address

2. Type of training institution: Private __ Public X Two-Year X Four-Year X

3. Number of years your institution has been in mining training: 1 2 3 4 5 6 7 8 9 10 5

4. Type of degree your institution grants in mining: Certificate, one-year or less __

Two-year Associate Science Degree X Four-year Bachelor of Science Degree __ Management Training __

Technical Training __ Engineering Training __ Surface __ Underground X

5. Number of students your institution has had, now has, and will have in your-best judgment. (List students by FTE) 100 - 80 - 200

	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981
UNDERGROUND TRAINING														
Non-degree/non-certificate program														
Certificate, one-year or less														
Two-year A.S. Degree						X	X	X	X	X	X	X	X	X
Four-year B.S. Degree													X	X
SURFACE TRAINING														
Non-degree/non-certificate program														
Certificate, one-year or less														
Two-year A.S. Degree														
Four-year B.S. Degree														

6. Placement information on graduates:

A. The number of graduates from your program 50
B. The per cent placed in the mining industry 92%
C. The per cent which are placed in related industry Unknown

Remarks on where the graduates not employed in the mining industry or a related industry are:

Unknown at this time

7. Instructor qualifications:

A. Number of instructors employed 2 (full-time) * (adjunct faculty)

B. Ratio of students to instructors is 40 to one

C. Instructor qualifications:
Please list all instructors full or part-time and please do not list instructors by name.
Please include adjunct faculty teaching one credit hour or more.

	Years of mining experience	Type of employment in mines	Type of federal/state certification	Years of higher education training
1	4	Underground Labor, Adm., Educational & Training	Ky. 48 hr. & Various	½
2	1	Engineer	Ky. 48 hr. & Various	½
3				
4				
5				
6				
7				
8				

* Depends on Interdepartmental studies

8. Program Cost:

A. Total capital investment in your program, buildings, equipment, A.V. equipment, etc.

Unable to estimate at present

B. Unit cost per student: semester hr. Unable to estimate
quarter hr. Unable to estimate

REMARKS:

Please forgive the lack of detail in this report, but I wanted to get it to you as soon as possible. Please address correspondence to:

Forrest Cameron, Coordinator
Mining Technology
UPO 801
Morehead State University
Morehead, KY 40351

NATIONAL ENERGY EDUCATION BUSINESS AND LABOR CONFERENCE
COAL SURVEY COMPONENT

1. Name of the training institution Mountain Empire Community College

Drawer 700, Big Stone Gap, VA 24219
Address

2. Type of training institution: Private __ Public X Two-Year X Four-Year __

3. Number of years your institution has been in mining training: 1 2 3 (4) 5 6 7 8 9 10 ___

4. Type of degree your institution grants in mining: Certificate, one-year or less X

Two-year Associate Science Degree X Four-year Bachelor of Science Degree __ Management Training __

Technical Training __ Engineering Training __ Surface __ Underground X

5. Number of students your institution has had, now has, and will have in your best judgment. (List students by FTE)

UNDERGROUND TRAINING	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981
Non-degree/non-certificate program														
Certificate, one-year or less							41	48	47	59	94			
Two-year A.S. Degree											38			
Four-year B.S. Degree														

SURFACE TRAINING														
Non-degree/non-certificate program														
Certificate, one-year or less														
Two-year A.S. Degree														
Four-year B.S. Degree														

6. Placement information on graduates:

A. The number of graduates from your program 37
B. The per cent placed in the mining industry 98%
C. The per cent which are placed in related industry 02%

Remarks on where the graduates not employed in the mining industry or a related industry are:

All graduates are placed in a mining industry or mine related industry.

7. Instructor qualifications:

A. Number of instructors employed 3 (full-time) 8 (adjunct faculty)

B. Ratio of students to instructors is 20 to one

C. Instructor qualifications:
Please list all instructors full or part-time and please do not list instructors by name.
Please include adjunct faculty teaching one credit hour or more.

	Years of mining experience	Type of employment in mines	Type of federal/state certification	Years of higher education training
1	3	Electrician	All State & Federal	1 year
2	10	Foreman-Shift Supervisor	All State & Federal	4 yr. B.S. Degree
3	0	0	MSHA Retraining Approved	M.A. Degree
4	24	Foreman - Mine Rescue Instructor	MSHA Approved	0
5	25	Testing Department	MSHA Approved	B.S. Degree (Chemical En
6	17	Prof. Eng.	-------	AAS Degree
7	28	Mine Supt.	MSHA Approved	----------
8	30	Head MSHA Regional Office	MSHA Approved	----------

NATIONAL ENERGY EDUCATION BUSINESS AND LABOR CONFERENCE
COAL SURVEY COMPONENT

1. Name of the training institution The Pennsylvania State University

118 Mineral Sciences Bldg. University Park, PA 16802
Address

2. Type of training institution: Private __ Public X Two-Year X Four-Year X

3. Number of years your institution has been in mining training: 1 2 3 4 5 6 7 8 9 10 88

4. Type of degree your institution grants in mining: Certificate, one-year or less X

Two-year Associate Science Degree X Four-year Bachelor of Science Degree X Management Training X

Technical Training X Engineering Training X Surface X Underground X

5. Number of students your institution has had, now has, and will have in your best judgment. (List students by FTE)

We do not separate surface from underground

UNDERGROUND TRAINING	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	198
Non-degree/non-certificate program									2000	1500	1100	3000	5000	50(
Certificate, one-year or less	120	120	120	120	120	120	120	120	120	120	120	120	120	1:
Two-year A.S. Degree		9	27	41	70	85	115	200	200	220	250	250	280	3(
Four-year B.S. Degree	60	52	72	104	141	137	180	289	295	358	430	450	400	4(
SURFACE TRAINING														
Non-degree/non-certificate program														
Certificate, one-year or less														
Two-year A.S. Degree														
Four-year B.S. Degree														

*A separate form for each commonwealth campus is also included

6. Placement information on graduates:

A. The number of graduates from your program _____
B. The per cent placed in the mining industry 100
C. The per cent which are placed in related industry _____

Remarks on where the graduates not employed in the mining industry or a related industry are:

1. Most continuing education programs are aimed at those already employed

2. Associate Degree placement has been 100%; this will reduce to 90% if class size continues to grow.
3. The same is true for Baccalaureate degree

7. Instructor qualifications:

A. Number of instructors employed 39 (full-time) 1 (adjunct faculty)

B. Ratio of students to instructors is _____ to one This varies by program and location

C. Instructor qualifications:
Please list all instructors full or part-time and please do not list instructors by name.
Please include adjunct faculty teaching one credit hour or more.

	Years of mining experience	Type of employment in mines	Type of federal/state certification	Years of higher educatic training
1	18 faculty are in professional ranks; 13 possess a Ph.D., and 6 a P.E.			
2	14 faculty are instructors or research assistants; most have a Master's Degree			
3	7 faculty are special instructors in our continuing education programs; most have substantial industri experien			
4				
5				
6				
7				
8				

8. Program Cost:

A. Total capital investment in your program, buildings, equipment, A.V. equipment, etc.

Replacement cost - $20 million

B. Unit cost per student: semester hr. $53 Pennsylvania residents, $110 non-residents
quarter hr. _____

REMARKS:

NATIONAL ENERGY EDUCATION BUSINESS AND LABOR CONFERENCE
COAL SURVEY COMPONENT

1. Name of the training institution The Pennsylvania State University -- Fayette Campus

P.O. Box 519, Route 119 North, Uniontown, PA 15401
Address

2. Type of training institution: Private __ Public X Two-Year X Four-Year __

3. Number of years your institution has been in mining training: 1 2 3 4 5 6 7 8 9 (10) ___

4. Type of degree your institution grants in mining: Certificate, one-year or less __

Two-year Associate Science Degree X Four-year Bachelor of Science Degree __ (1st two years) Management Training X

Technical Training X Engineering Training X Surface __ Underground X

5. Number of students your institution has had, now has, and will have in your best judgment. (List students by FTE)

UNDERGROUND TRAINING	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981
Non-degree/non-certificate program														
Certificate, one-year or less														
Two-year A.S. Degree		9	27	41	70	85	115	150	150	170	170	170	170	170
Four-year B.S. Degree														

SURFACE TRAINING														
Non-degree/non-certificate program														
Certificate, one-year or less														
Two-year A.S. Degree														
Four-year B.S. Degree														

6. Placement information on graduates:

A. The number of graduates from your program 30-40 per year
B. The per cent placed in the mining industry 100%
C. The per cent which are placed in related industry _____

Remarks on where the graduates not employed in the mining industry or a related industry are:

_____

_____

7. Instructor qualifications:

A. Number of instructors employed 4 (full-time) 3 (adjunct faculty)

B. Ratio of students to instructors is 40 to one (full-time)

C. Instructor qualifications:
Please list all instructors full or part-time and please do not list instructors by name.
Please include adjunct faculty teaching one credit hour or more.

	Years of mining experience	Type of employment in mines	Type of federal/state certification	Years of higher education training
1	3	Engineer	P.E.	Ph.D.
2	3	Engineer		M.S., Ph.D. seeking
3	20	Cost engineer		B.S.
4	20	Supervisor of maintenance	Electrician & miner papers	
5				
6				
7				
8				

8. **Program Cost:**

A. Total capital investment in your program, buildings, equipment, A.V. equipment, etc.

$1 million

B. Unit cost per student: semester hr. $41 Pennsylvania Residents; $110 non-residents
quarter hr. _____

REMARKS:

NATIONAL ENERGY EDUCATION BUSINESS AND LABOR CONFERENCE
COAL SURVEY COMPONENT

1. Name of the training institution Pennsylvania State University - Altoona Campus

Altoona, Pennsylvania 16603
Address

2. Type of training institution: Private __ Public X Two-Year X Four-Year X First 2 years

3. Number of years your institution has been in mining training: 1 2 (3) 4 5 6 7 8 9 10 ___

4. Type of degree your institution grants in mining: Certificate, one-year or less __

Two-year Associate Science Degree X Four-year Bachelor of Science Degree 2 yrs. Management Training X

Technical Training X Engineering Training X Surface __ Underground X

5. Number of students your institution has had, now has, and will have in your best judgment. (List students by FTE)

	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981
UNDERGROUND TRAINING														
Non-degree/non-certificate program														
Certificate, one-year or less														
Two-year A.S. Degree								50	50	50	60	60	70	80
Four-year B.S. Degree														
SURFACE TRAINING														
Non-degree/non-certificate program														
Certificate, one-year or less														
Two-year A.S. Degree														
Four-year B.S. Degree														

6. Placement information on graduates:

A. The number of graduates from your program 20 per year
B. The per cent placed in the mining industry 100 %
C. The per cent which are placed in related industry _____

Remarks on where the graduates not employed in the mining industry or a related industry are:

_____

_____

7. Instructor qualifications:

A. Number of instructors employed 2 (full-time) _____ (adjunct faculty)

B. Ratio of students to instructors is 30 to one

C. Instructor qualifications:
Please list all instructors full or part-time and please do not list instructors by name.
Please include adjunct faculty teaching one credit hour or more.

	Years of mining experience	Type of employment in mines	Type of federal/state certification	Years of higher education training
1	20	Engineering, sales		B.S.
2	10	Engineering, sales		B.S., M.S. seeking
3				
4				
5				
6				
7				
8				

8. Program Cost:

A. Total capital investment in your program, buildings, equipment, A.V. equipment, etc.

$1 million

B. Unit cost per student: semester hr. $41 Pennsylvania residents; $110 non-residents
quarter hr. _____

REMARKS:

NATIONAL ENERGY EDUCATION BUSINESS AND LABOR CONFERENCE
COAL SURVEY COMPONENT

1. Name of the training institution Pennsylvania State University - New Kensington Campus

3550 7th Street Rd, New Kensington, Pennsylvania 15068
Address

2. Type of training institution: Private __ Public X Two-Year __ Four-Year 1st two years

3. Number of years your institution has been in mining training: (1) 2 3 4 5 6 7 8 9 10 ____

4. Type of degree your institution grants in mining: Certificate, one-year or less __

Two-year Associate Science Degree X Four-year Bachelor of Science Degree 1st 2 yrs. Management Training X

Technical Training X Engineering Training X Surface __ Underground X

5. Number of students your institution has had, now has, and will have in your best judgment. (List students by FTE)

UNDERGROUND TRAINING	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981
Non-degree/non-certificate program														
Certificate, one-year or less														
Two-year A.S. Degree											20	20	40	50
Four-year B.S. Degree														

SURFACE TRAINING														
Non-degree/non-certificate program														
Certificate, one-year or less														
Two-year A.S. Degree														
Four-year B.S. Degree														

6. Placement information on graduates:

A. The number of graduates from your program 0
B. The per cent placed in the mining industry _____
C. The per cent which are placed in related industry _____

Remarks on where the graduates not employed in the mining industry or a related industry are:

_____

_____

7. Instructor qualifications:

A. Number of instructors employed 1 (full-time) _____ (adjunct faculty)

B. Ratio of students to instructors is _____ to one

C. Instructor qualifications:
Please list all instructors full or part-time and please do not list instructors by name.
Please include adjunct faculty teaching one credit hour or more.

	Years of mining experience	Type of employment in mines	Type of federal/state certification	Years of higher education training
1	20	Design Engineer		B.S., M.S.
2				
3				
4				
5				
6				
7				
8				

8. Program Cost:

A. Total capital investment in your program, buildings, equipment, A.V. equipment, etc.

$.5 million

B. Unit cost per student: semester hr. $41 resident of Pennsylvania/ $110 non-resident
quarter hr. _____

REMARKS:

NATIONAL ENERGY EDUCATION BUSINESS AND LABOR CONFERENCE
COAL SURVEY COMPONENT

1. Name of the training institution Rend Lake College

Rural Route 1, Ina, IL 62846
Address

2. Type of training institution: Private __ Public __ Two-Year x Four-Year __

3. Number of years your institution has been in mining training: 1 2 3 4 5 (6) 7 8 9 10 ____

4. Type of degree your institution grants in mining: Certificate, one-year or less x

Two-year Associate Science Degree x Four-year Bachelor of Science Degree __ Management Training __

Technical Training x Engineering Training __ Surface __ Underground x

5. Number of students your institution has had, now has, and will have in your best judgment. (List students by FTE)

	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1
UNDERGROUND TRAINING														
Non-degree/non-certificate program								6	160	282	235	270	297	31
Certificate, one-year or less														
Two-year A.S. Degree							9	33	89	171	216	225	247	25
Four-year B.S. Degree								3	5	1		1	2	
SURFACE TRAINING														
Non-degree/non-certificate program														
Certificate, one-year or less														
Two-year A.S. Degree														
Four-year B.S. Degree														

6. Placement information on graduates:

A. The number of graduates from your program 136
B. The per cent placed in the mining industry 83
C. The per cent which are placed in related industry 7.6

Remarks on where the graduates not employed in the mining industry or a related industry are:

General Tire

7. Instructor qualifications:

A. Number of instructors employed 20 (full-time) 8 (adjunct faculty)

B. Ratio of students to instructors is 22.6 to one

C. Instructor qualifications:
Please list all instructors full or part-time and please do not list instructors by name.
Please include adjunct faculty teaching one credit hour or more.

	Years of mining experience	Type of employment in mines	Type of federal/state certification	Years of higher educati training
1	0		1st.Aid,Mod.Mine Rescue Elect(U&S),GA,GB,CH,Instruc. Elect.	6
2	0		1st.Aid,Mod.Mine Rescue, Elect(U),GA,GB,CH	2
3	5¼	Machine Operator, Underground Electrician & Repairman	Face,Exam.Cert.,1st.Aid, Mod.Mine Rescue,Roof & Rib Control,Elect(U&S) GA,GB,CH,Instruc.Annual Retraining	2
4	0		Mod.Mine Rescue,GA,GB, CH	4
5	0		Mod.Mine Rescue,Elect. (U&S),Instruc.Elect(U&S) CH,GA,GB	1
6	0		0	4

	Years of mining experience	Type of employment in mines	Type of federal/state Certification	Years of education
7	0		0	4
8	0		1st.Aid,Mod.Mine Rescue Gas Detect.&Instru.,M-402, Methane Spotter,Flame Safety Lamp,U.Orient.,Self Rescuer,CH,GA,GB	4
9	10	Management - Trainee to section foreman classification	1st.Class Miner Cert., Mine Exam.,Mine Manager, 1st Aid Instruc.,Mine Rescue Instruc.,GA,FA,GB Instruc.,Gas Detection, Mine Vent.,Roof & Rib Cont., Job Safety, Safety & Accident Prev.,Blasting & Explosives,Cutcuit Test., Dust-noise Control,Elect(U&S)	1
10	0		CH,GA,GB,Elect. Self Rescuer, 1st.Aid Methods	2
11	8	Machine operation, repairman, and section foreman	1st.Class Miner Cert., Mine Exam.,1st Aid & Mine Rescue,Roof & Rib Control,G-70, M-402,Flame Safety Lamp,Mine Rescue,Self Rescuer,MSA Meth. Spotter,Bacharach Meth.Det., Trailing Cable Splicing, Qual.Instruc.,Fyrite 02 Indic., Monoxor CO Indic.,Health & Safety Act,Part 75,Ventilation, Accid. Prevention,Mining Machinery, CH,GA,GB	1
12	17½	Surface mine electrician	Elect.(U&S),Qual.Instruc. in Exam.Prep.course,annual retrain. elect.(U&S),80-hr.supervisor(S&U) CH,GA,GB	0
13	3	Engineering	1st.Class Miner Cert.,Mine Exam, 1st Aid & Mine Rescue, Elect.(U&S),Instruc. in Elect.	4

	Years of mining experience	Type of employment in mines	Type of federal/state certification	Years of higher education/trai
13(Cont.)			(U&S), 1st.Aid,Mine Rescue, Fed.Law,Parts 75 & 77,Coal Mine Vent.,Roof & Rib Control, Gas Detection,CH,GA,GB	
14	29	Machine Operator, Belt Maintenance, Mine foreman, Deputy safety director	Mine Man. & Examiner, 1st.Class Miner,Mine Rescue,1st.Aid,Flame Safety Lamp,Self Rescuer,Respirable Coal Dust,Noice Generation & Control,Instruc.Qual. in Accid. Prev,Flame Safety Lamp,Mine Vent., Roof & Rib Control,Self Rescuer,G-70 M402,Methane Spotter,1st.Aid Methods & Refresher,Mine Rescue,Healty & Safety Act,Part 75, Flame Safety Lamp,CH,GA,GB	0
15	35	Hoisting Engineer & Operating Engineer	Hoisting Engineer(Elect.& Steam), 1st.Aid,Mod.Mine Rescue,CPR,EMT, Qual. Instruc. in 1st.Aid,CPR. CH,GA,GB	4
16	4	Machine Operator & Repairman	CH,GA,GB	2
17	4½	Machine Operator & Repairman	1st.Class Miner,Examiner,Manager, 1st.Aid, Mod.Mine Rescue, Elect.(U), Qual. Instruc. in 1st.Aid,Mine Gases, Fed. Law(Part 75),Mine Rescue,Roof & Rib Control,CH,GA,GB	4
18	4	Machine Operator & Repairman	1st.Class Miner,Mine Examiner,1st. Aid,Health & Safety Act(Part 75), Elect.(U&S),Ventilation,GA,GB, Flame Safety Lamp, Methane Detector, CH, Electrical	1 ½
19	0		1st.Aid Methods,Self Rescuer,CH,GA, GB, Electrical	5
20	1 1/3	Laborer & Machine Operator	1st.Class Miner,1st.Aid, Mod. Mine Rescue,CH,GA,GB	4
21-29 (Adjunct Faculty)	Various	Union & Management Classes	Various	Unknown

8. Program Cost:

A. Total capital investment in your program, buildings, equipment, A.V. equipment, etc.

$1,500,000

B. Unit cost per student: semester hr. $55.52
quarter hr. _____

REMARKS:

NATIONAL ENERGY EDUCATION BUSINESS AND LABOR CONFERENCE
COAL SURVEY COMPONENT

1. Name of the training institution Sheridan College

P.O. Box 1500, Sheridan, Wyoming 82801
Address

2. Type of training institution: Private __ Public __ Two-Year X Four-Year __

3. Number of years your institution has been in mining training: (1½) 2 3 4 5 6 7 8 9 10 ___

4. Type of degree your institution grants in mining: Certificate, one-year or less X

Two-year Associate Science Degree X Four-year Bachelor of Science Degree __ Management Training __

Technical Training X Engineering Training X Surface X Underground __

5. Number of students your institution has had, now has, and will have in your best judgment. (List students by FTE)

UNDERGROUND TRAINING	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	198
Non-degree/non-certificate program														
Certificate, one-year or less														
Two-year A.S. Degree														
Four-year B.S. Degree														
SURFACE TRAINING														
Non-degree/non-certificate program														
Certificate, one-year or less										28	25	60	100	
Two-year A.S. Degree										2	5	10	20	
Four-year B.S. Degree														

6. Placement information on graduates:

A. The number of graduates from your program 2
B. The per cent placed in the mining industry 2
C. The per cent which are placed in related industry 0

Remarks on where the graduates not employed in the mining industry or a related industry are:

7. Instructor qualifications:

A. Number of instructors employed 4 (full-time) 5 (adjunct faculty)

B. Ratio of students to instructors is 10 to one

C. Instructor qualifications:
Please list all instructors full or part-time and please do not list instructors by name.
Please include adjunct faculty teaching one credit hour or more.

	Years of mining experience	Type of employment in mines	Type of federal/state certification	Years of higher educati training
1	2	Engineer	PE (2)	7
2	2	Welding Supervisor	Federal/State	6
3	0	(Geology)	- - - - -	6
4	1	Hydraulics	- - - - -	2
5	3	Engineer	- - - - -	4
6	2	Engineer	PE	5
7	4	Reclamation Engineer	Ph.D.	8
8	2	Engineer	- - - - -	4

8. Program Cost:

A. Total capital investment in your program, buildings, equipment, A.V. equipment, etc.

$900,000 bldg. $135,000 equipment, $50,000 AV

B. Unit cost per student: semester hr. _____
quarter hr. _____

REMARKS:

NATIONAL ENERGY EDUCATION BUSINESS AND LABOR CONFERENCE
COAL SURVEY COMPONENT

1. Name of the training institution Southeastern Illinois College

R.R. #4, Harrisburg, IL 62946
Address

2. Type of training institution: Private __ Public X Two-Year X Four-Year __

3. Number of years your institution has been in mining training: 1 2 3 4 (5) 6 7 8 9 10 ___

4. Type of degree your institution grants in mining: Certificate, one-year or less X

Two-year Associate Science Degree X Four-year Bachelor of Science Degree __ Management Training X

Technical Training __ Engineering Training __ Surface __ Underground X

5. Number of students your institution has had, now has, and will have in your best judgment. (List students by FTE)

UNDERGROUND TRAINING	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	198
Non-degree/non-certificate program														
Certificate, one-year or less						60	~~105~~	~~106~~	16	1	6			
Two-year A.S. Degree									51	59	63			
Four-year B.S. Degree														

SURFACE TRAINING														
Non-degree/non-certificate program														
Certificate, one-year or less														
Two-year A.S. Degree														
Four-year B.S. Degree														

6. Placement information on graduates:

A. The number of graduates from your program 36 (Majority of students were already em-
B. The per cent placed in the mining industry 90 ployed by mines, & took courses to help
C. The per cent which are placed in related industry 5 them with their jobs.)

Remarks on where the graduates not employed in the mining industry or a related industry are:

Supply Industries - Mine Service.

7. Instructor qualifications:

A. Number of instructors employed _____ (full-time) 4-8 per yr. (adjunct faculty)

B. Ratio of students to instructors is 20 to one

C. Instructor qualifications:
Please list all instructors full or part-time and please do not list instructors by name.
Please include adjunct faculty teaching one credit hour or more.

	Years of mining experience	Type of employment in mines	Type of federal/state certification	Years of higher educatic training
1	37 yrs.	Mine Supervisor	None	5
2	8 yrs.	Mine Safety Supervisor	All Certifications Available	2
3	4 yrs.	Mine Engineer	None	4
4	14 yrs.	Processing Chief	All Certifications Available	3
5	8 yrs.	Mine Engineer	State - Surface Mine Supervisor Fed. - Dam Inspector Instruct	3
6	12 yrs.	Mine Engineer	Fed. 1st Aid & Safety Fed. Surface & II. Surface	4
7				
8				

8. Program Cost:

A. Total capital investment in your program, buildings, equipment, A.V. equipment, etc.

$75,000.00.

B. Unit cost per student: semester hr. $64.86
quarter hr. _____

REMARKS:

NATIONAL ENERGY EDUCATION BUSINESS AND LABOR CONFERENCE
COAL SURVEY COMPONENT

1. Name of the training institution Southwest Virginia Community College

Box SVCC, Richalnds, Virginia 24641
Address

2. Type of training institution: Private __ Public X Two-Year X Four-Year __

3. Number of years your institution has been in mining training: 1 2 3 4 5 6 (7) 8 9 10 ___

4. Type of degree your institution grants in mining: Certificate, one-year or less X

Two-year Associate Science Degree X Four-year Bachelor of Science Degree __ Management Training X

Technical Training X Engineering Training X Surface __ Underground X

5. Number of students your institution has had, now has, and will have in your best judgment. (List students by FTE)

UNDERGROUND TRAINING	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	198
Non-degree/non-certificate program														
** Certificate, one-year or less						- -	26	68	52	93	76			
* Two-year A.S. Degree						112	158	199	225	260	298			
Four-year B.S. Degree						- -	- -	- -	- -	- -	- -			
SURFACE TRAINING														
Non-degree/non-certificate program														
Certificate, one-year or less														
Two-year A.S. Degree														
Four-year B.S. Degree														

* Includes only mining technology (A.A.S.) and Engineering (A.S.) Most of the latter continue for B.S. degrees in Mining Engineering. The remainder are in other fields.

** Conservative figure: includes only Mine Machinery Maintenance Program

6. Placement information on graduates:

A. The number of graduates from your programs 162 (A.S., A.A.S., and certificates)
B. The per cent placed in the mining industry 99% approximately
C. The per cent which are placed in related industry 1%

Remarks on where the graduates not employed in the mining industry or a related industry are:

A handful of graduates have moved to other states and use their engineering background in firms like G. E., Dupont, Procter & Gamble, etc.

7. Instructor qualifications:

A. Number of instructors employed 10 (full-time) 70 (adjunct faculty) (estimate cumulative)

B. Ratio of students to instructors is 15 to one average

C. Instructor qualifications:
Please list all instructors full or part-time and please do not list instructors by name.
Please include adjunct faculty teaching one credit hour or more.

		Years of mining experience	Type of employment in mines	Type of federal/state certification	Years of higher educati training
Full-time	1	- - -	- - - -	- - -	Doctorate Enginee
Full-time	2	2 consultant		- - -	Doctorate Enginee
Full-time	3	8	Foreman	Foreman, State	Baccalaureate Mine Eng.
Full-time	4	10	Foreman	Foreman, State	Associate Degree
Full-time	5	4	General Inside Labor	MSHA Instructor	Baccalaureate Bus. Admi
Full-time	6	- - -	- - -	Certificate and other E.M.T. instructor	(Minor in mining) Assoc. Degree (Nursing)
Full-time	7	0.25	Inspector's Assistant	Mining Academy Training	Master's Degree
	8				

Adjunct faculty are too numerous to list on a cumulative basis. They have at least 5 years of mining experience each.

8. Program Cost:

A. Total capital investment in your program, buildings, equipment, A.V. equipment, etc.

$1,000,000 for mining-related programs along (conservative figure)

B. Unit cost per student: semester hr. _____
quarter hr. $28 - $43 per credit hour

REMARKS: varies, depending on the particular mining related program

NATIONAL ENERGY EDUCATION BUSINESS AND LABOR CONFERENCE
COAL SURVEY COMPONENT

1. Name of the training institution Wabash Valley College

2200 College Drive, Mt. Carmel, IL 62863
Address

2. Type of training institution: Private __ Public X Two-Year X Four-Year __

3. Number of years your institution has been in mining training: 1 2 3 4 5 (6) 7 8 9 10 ___

4. Type of degree your institution grants in mining: Certificate, one-year or less X

Two-year Associate Science Degree X Four-year Bachelor of Science Degree __ Management Training __

Technical Training __ Engineering Training __ Surface __ Underground X

5. Number of students your institution has had, now has, and will have in your best judgment. (List students by FTE)

UNDERGROUND TRAINING	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981
Non-degree/non-certificate program														
Certificate, one-year or less						17								
Two-year A.S. Degree														
Four-year B.S. Degree														
SURFACE TRAINING														
Non-degree/non-certificate program														
Certificate, one-year or less														
Two-year A.S. Degree														
Four-year B.S. Degree														

6. Placement information on graduates:

A. The number of graduates from your program _____
B. The per cent placed in the mining industry _____
C. The per cent which are placed in related industry _____

Remarks on where the graduates not employed in the mining industry or a related industry are:

_____

_____

7. Instructor qualifications:

A. Number of instructors employed _____ (full-time) _____ (adjunct faculty)

B. Ratio of students to instructors is _____ to one

C. Instructor qualifications:
Please list all instructors full or part-time and please do not list instructors by name.
Please include adjunct faculty teaching one credit hour or more.

	Years of mining experience	Type of employment in mines	Type of federal/state certification	Years of higher education training
1				
2				
3				
4				
5				
6				
7				
8				

8. **Program Cost:**

A. Total capital investment in your program, buildings, equipment, A.V. equipment, etc.

_____

B. Unit cost per student: semester hr. _____
quarter hr. _____

REMARKS:

NATIONAL ENERGY EDUCATION BUSINESS AND LABOR CONFERENCE
COAL SURVEY COMPONENT

1. Name of the training institution West Virginia Institute of Technology

   Montgomery, WV 25136
   Address

2. Type of training institution: Private __ Public X Two-Year X Four-Year X

3. Number of years your institution has been in mining training: 1 2 3 4 5 6 7 8 9 10 7

4. Type of degree your institution grants in mining: Certificate, one-year or less X

   Two-year Associate Science Degree X Four-year Bachelor of Science Degree X Management Training __

   Technical Training __ Engineering Training __ Surface __ Underground __

5. Number of students your institution has had, now has, and will have in your best judgment. (List students by FTE)

UNDERGROUND TRAINING

	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981
Non-degree/non-certificate program														
Certificate, one-year or less	*							10	12	9	6			
Two-year A.S. Degree	*				10	13	53	78	152	175	222	200	200	180
Four-year B.S. Degree	*								10	18	38	50	50	60

*These figures are only approximate since several students are in mining as well as other programs such as Electrical & Mechnical.

SURFACE TRAINING

Non-degree/non-certificate program														
Certificate, one-year or less														
Two-year A.S. Degree											12	25	35	40
Four-year B.S. Degree														

6. Placement information on graduates:

A. The number of graduates from your program 131
B. The per cent placed in the mining industry 80
C. The per cent which are placed in related industry 18

Remarks on where the graduates not employed in the mining industry or a related industry are:

Service or School

7. Instructor qualifications:

A. Number of instructors employed 4 (full-time) 9 (adjunct faculty)
(Average Per Semester)

B. Ratio of students to instructors is _____ to one

C. Instructor qualifications:
Please list all instructors full or part-time and please do not list instructors by name.
Please include adjunct faculty teaching one credit hour or more.

	Years of mining experience	Type of employment in mines	Type of federal/state certification	Years of higher education training
1	10	Engineering	Foreman, Rescue Team, PE	5+
2	2	Engineering & Maintenance	PE SET	6
3	½	Geology Consulting	Prof. Gedogist	8
4	6	Engineering	PE	5
5	1	Engineering	Unknown	5
6	10	Preparation Plant Supervision	Federal Inspector	4
7	20	Maintenance & Maintenance Instruction	Unknown	4
8				

Other part-time faculty hold various positions in the industry, at the MSHA Academy, etc. They generally only teach one class such a mine Design, Safety English, and Production Management. The average education

8. Program Cost:

A. Total capital investment in your program, buildings, equipment, A.V. equipment, etc.
Mining Building & Equipment $400,000
C & I Building $5,000,000 used for all support classes

B. Unit cost per student: semester hr. $10.20 $185.00 per semester for full-time student
quarter hr. _____

REMARKS:

NATIONAL ENERGY EDUCATION BUSINESS AND LABOR CONFERENCE
COAL SURVEY COMPONENT

1. Name of the training institution RALPH R. WILLIS VOCATIONAL CENTER

Box 1747; Logan, WV 25601
Address

2. Type of training institution: Private __ Public X Two-Year __ Four-Year __

3. Number of years your institution has been in mining training: 1 2 3 4 5 6 7 8 9 10 ___

4. Type of degree your institution grants in mining: Certificate, one-year or less X

Two-year Associate Science Degree __ Four-year Bachelor of Science Degree __ Management Training X

Technical Training __ Engineering Training __ Surface X Underground X

5. Number of students your institution has had, how has, and will have in your best judgment. (List students by FTE)

	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	198
UNDERGROUND TRAINING														
Non-degree/non-certificate program								350	750	800	750			
Certificate, one-year or less			25	50	50	50	100	150	150	150	150			
Two-year A.S. Degree														
Four-year B.S. Degree														
SURFACE TRAINING														
Non-degree/non-certificate program										50	200			
Certificate, one-year or less														
Two-year A.S. Degree														
Four-year B.S. Degree														

6. Placement information on graduates:

A. The number of graduates from your program 875*
B. The per cent placed in the mining industry 70%
C. The per cent which are placed in related industry 20%

Remarks on where the graduates not employed in the mining industry or a related industry are:

* I have only reported graduates from programs which are at least 8 to 12 weeks in duration.

7. Instructor qualifications:

A. Number of instructors employed 6 (full-time) _____ (adjunct faculty)

B. Ratio of students to instructors is 20 to one

C. Instructor qualifications:
Please list all instructors full or part-time and please do not list instructors by name.
Please include adjunct faculty teaching one credit hour or more.

	Years of mining experience	Type of employment in mines	Type of federal/state certification	Years of higher educatio training
1	35	Maintenance Foreman	Both	3
2	37	Superintendent	Both	0
3	28	Engineer (Non-Degree)	Both	0
4	15	Foreman (Production)	Both	0
5	14	Foreman (Production)	Both	0
6	7	Electrician/Mechanic	Both	1
7				
8				

8. Program Cost:

A. Total capital investment in your program, buildings, equipment, A.V. equipment, etc.

0 million dollars

B. Unit cost per student: semester hr. _____
quarter hr. _____

REMARKS:

We do not operate like a college. Most of our postsecondary programs are C.E.T.A. or are funded through state postsecondary funds on a per program basis.

CURRICULA INFORMATION

CURRICULA INFORMATION

Growth projections for mining clearly indicate the largest number of new mining employees will enter the industry as production workers. This influx of new miners during the next ten years will require major efforts in mining training. The purpose of this report is to present curricula information which will allow institutions with ongoing mining training programs to compare their programs with those of other institutions, and to provide institutions contemplating a mining training program an opportunity to review curricula information of educational institutions with such programs currently in operation. To gather the information, the task force contacted all schools registered with the American Association of Community and Junior Colleges which offer coal mining training. Some schools offer both two-year and four-year programs. While the focus of this report is two-year training programs, information regarding four-year training programs has been included.

The colleges and institutions which have taken part in the study are:

Beckley College, Beckley, West Virginia
Belmont Technical College, St. Clairsville, Ohio
Bluefield State College, Bluefield, West Virginia
Casper College, Casper, Wyoming
College of Eastern Utah, Price, Utah
Fairmont State College, Fairmont, West Virginia
Hazard Community College, Hazard, Kentucky
Indiana Vocational-Technical College, Terre Haute, Indiana
Madisonville Community College, Madisonville, Kentucky
Mountain Empire Community College, Madisonville, Kentucky
Pennsylvania Community College, Madisonville, Kentucky
Pikeville College, Pikeville, Kentucky

CURRICULA INFORMATION (cont)

Colleges and institutions which have taken part in the study (cont):

Rend Lake College, Ina, Illinois
Sheridan College, Sheridan, Wyoming
Southeast Community College, Cumberland, Kentucky
Wabash Valley College, Mt. Carmel, Illinois

BECKLEY COLLEGE
BECKLEY, WEST VIRGINIA
25801
304/253-7351

ASSOCIATE OF SCIENCE DEGREE

MINING TECHNOLOGY

		Credit Hours
101	MINING METHODS	3
102	INSTRUMENTS AND APPARATUS	3
103	MINE SUPERVISION	3
104	VENTILATION	3
106	ELECTRICAL MACHINERY	3
107	MINE HYDRAULICS	3
201	MAP READING AND SURVEYING	3
202	LEADERSHIP AND MANAGEMENT	3
204	GEOLOGY OF COAL	1
205	COAL PREPARATION AND ANALYSIS	3
206	ADVANCED ELECTRICAL MACHINERY	3
207	ADVANCED MINE HYDRAULICS	3
208	CUTTING AND WELDING	3
	TOTAL HOURS	37

101 MINING METHODS: Electicity, haulage, drainage, roof and rib control. Comprehensive study of equipment and techniques for extraction and transportation of coal. Study of equipment used in drainage and roof control (support), the use of electric power in coal mines, and timbering and pinning equipment.

102 INSTRUMENTS AND APPARATUS: Mine safety and first aid. Training by instruction and demonstration of safe and unsafe practices with a view to reducing accidents, teach correct emergency aid for injured persons and familiarization with the principles of mine rescue equipment and operations.

103 MINE SUPERVISION: Mining laws, penalties, records, permits and daily reports. Total picture of problems of management relations, grievances and contract disputes. An indepth study of Federal Health and Safety Act; West Virginia mining laws; company rules; OSHA when applicable.

104 VENTILATION: Mine gases, mine fires, and explosions. Principles, purpose, methods and equipment pertaining to the ventilation of mines; causes, prevention and control of mine fires; detection and control of major mine gases.

106 ELECTRICAL MACHINERY: An introduction to electricity and electrical circuits. Includes testing, trouble-shooting, basic maintenance of electrical components of mine machinery, use of common test equipment and schematic diagrams.

107 MINE HYDRAULICS: A study of the fundamentals of hydraulic pressure, direction and flow. It includes operation, maintenance and repair of hydraulic components including reservoirs, pumps, lines, valves, motors, cylinders, etc.

201 MAP READING AND SURVEYING: The basic techniques of mine map reading and construction. Instruments and equipment used in mine survey.

202 LEADERSHIP AND MANAGEMENT: Economic, governmental, social, cost, and labor aspects of mining as related to the management of a mining enterprise.

204 GEOLOGY OF COAL: Study of types, formation structure, and stratification of coal.

205 COAL PREPARATION AND ANALYSIS: Preparation, benefication, and concentration of non-metallic ores (coal) for further processing or utilization. Prep-plant visitation.

207 ADVANCED MINE HYDRAULICS: Continuation of Mine Hydraulics 107.

BELMONT TECHNICAL COLLEGE
INTERSTATE 70 at STATE ROUTE 331
ST. CLAIRSVILLE, OHIO 43950
614/695-9500

ASSOCIATE DEGREE IN APPLIED SCIENCE

MINING TECHNOLOGY

First Quarter		Credit Hours
GE 111	COMMUNICATIONS I	3
GE 171	APPLIED SOCIOLOGY	4
BS 301	TECHNICAL MATHEMATICS I	4
LS 723	DRAFTING AND MAPPING	2
MI 701	INTRODUCTION TO MINING	4
Second Quarter		
BM 401	INDUSTRIAL RELATIONS	4
GE 112	COMMUNICATIONS II	3
BS 302	TECHNICAL MATHEMATICS II	5
MI 702	MINING GEOLOGY	4
MI 715	PRINCIPLES OF MINE RESCUE	3
Third Quarter		
GE 116	TECHNICAL COMMUNICATIONS	3
BS 321	APPLIED PHYSICS	4
MI 701	MINE SURVEYING I	4
MI 706	MINING PRACTICES	4
Fourth Quarter		
MI 795	MI INTERNSHIP and SEMINAR I	2-7
MI 799	SPECIAL PROBLEMS I	1-4
Fifth Quarter		
GE 121	PRINCIPLES OF SUPERVISION AND MANAGEMENT	3
MI 705	MINE SURVEYING II	4
MI 711	MINE VENTILATION	3
MI 708	MINE HAULAGE AND MACHINERY	3
MI 709	EXPLOSIVES AND BLASTING	3
MI 711	MINE VENTILATION	3
Sixth Quarter		
BB 285	PRINCIPLES OF ECONOMICS	3
MI 707	MINE ELECTRICAL SYSTEMS AND INSTALLATIONS	4
MI 710	ROOF STRUCTURE AND SUPPORT	3
MI 712	PUMPING AND DRAINAGE	3

Seventh Quarter		Credit Hours
GE 161	APPLIED PSYCHOLOGY	4
DP 429	COMPUTER CONCEPTS	3
MI 713	MINING LAW AND SAFETY	3
MI 714	MINERAL PREPARATION AND ECONOMICS	4
Eighth Quarter		
MI 797	MI INTERNSHIP AND SEMINAR II	2-7
MI 800	SPECIAL PROBLEMS II	1-4
	TOTAL HOURS	106-126

ELECTIVES

MI 798	MINING ORIENTATION	3

CERTIFICATE IN HEAVY EQUIPMENT MAINTENANCE/OPERATION:

LS 708	EQUIPMENT USE AND EVALUATION
LS 713	SURFACE MINING AND REGULATORY LAWS
ME 761	LUBRICATION
ME 765	HYDRAULICS AND PNEUMATICS I
MI 808	HEAVY EQUIPMENT I
MI 802	HEAVY EQUIPMENT II
MI 803	HEAVY EQUIPMENT III
MI 804	HI-LIFT OPERATION AND MAINTENANCE

BLUEFIELD STATE COLLEGE
BLUEFIELD, WEST VIRGINIA
24701

304/325-710

ASSOCIATE OF SCIENCE DEGREE

MINING TECHNOLOGY

First Semester		Credit Hours
COSC 100	COMPUTATIONAL METHODS	1
ENGL 101	COMPOSITION I	3
GNET 101	TECHNICAL PHYSICS I	4
GNET 110	ENGINEERING DRAFTING	3
GNET 115	TECHNICAL MATHEMATICS I	4
MIET 101	FUNDAMENTALS OF MINING	2
MIET 103	GEOLOGY OF COAL	1
Second Semester		
CIET 110	ELEMENTARY SURVEYING AND MAPPING	4
ENGL 102	COMPOSITION II	3
GNET 102	TECHNICAL PHYSICS	4
GNET 116	TECHNICAL MATHEMATICS II	4
MIET 110	ADVANCED MINING	3
Third Semester		
CIET 203	STATICS AND STRENGTH OF MATERIALS	4
COSC 311	FORTRAN PROGRAMMING	3
ENGR 315	ENGINEERING ECONOMY	3
MIET 203	MINE DRAFTING AND MAPPING	3
MIET 205	MINE SAFETY AND MINING LAWS	2
MIET 210	MINE VENTILATION	3
Fourth Semester		
BUSN 110	BUSINESS PSYCHOLOGY	3
ELET 206	ELECTRICAL MACHINERY	4
MIET 208	MINE SUPERVISION	2
MIET 212	COAL PREPARATION AND ANALYSIS	3
MIET 214	MINE HYDRAULICS	3
	SOCIO-HUMANISTIC ELECTIVE	3
	TOTAL HOURS	72

101 FUNDAMENTALS OF MINING: A course designed to familiarize the student with basic mining concepts and terminology. Topics introduced include physics and chemistry, coal mine gases, ventilation, drainage and pumping, timbering, roof control, explosives and blasting, mine transportation, mine machinery, and coal preparation.

103 GEOLOGY OF COAL: A study of the earth, forces of the atmosphere, rain, water, ice, rocks of the earth, historical geology, origin of coal, structural features, coal classification and coal resources.

110 ADVANCED MINING: A continuation of MIET 101. Various methods of coal prospecting (core drilling) and production are explored. the principles of surface mining and underground mining are studied with emphasis on major problems encountered with each type of mining. Techniques of recovery, production planning, mine projections and forecasts are also considered.

203 MINE DRAFTING AND MAPPING: The basic techniques of mine map reading and construction are discussed and practiced. The relations between mine law, mine surveys, and mine mapping are studied and the use of the mine map as a production tool is emphasized.

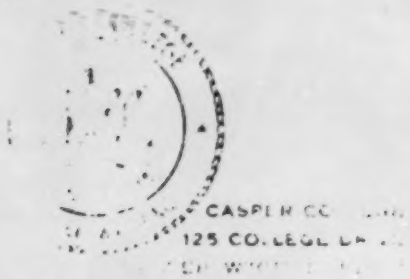
205 MINE SAFETY AND MINING LAWS: A study of the various health and safety hazards encountered in the mining industry. The techniques used to minimize hazards are examined and the mining laws of the State of West Virginnia and the U.S. Department of the Interior are studied in detail.

208 MINE SUPERVISION: Interrelationship between various levels of differing mining organization is presented with special emphasis on unique management problems encountered in the mining industry. The requirements for foreman certification are analyzed and a review for the foreman's certification test is conducted.

210 MINE VENTILATION: A study of the ventilation requirements of underground mines in which the basic principles of air flow are are presented. The techniques and equipment used to maintain proper ventilation are studied in depth. Laboratory sessions provide practice in designing and maintaining proper air flow and in using air flow monitoring equipment.

212 COAL PREPARATION AND ANALYSIS: A study of the various characteristics of coal and the techniques used to determine these characteristics. The methodology and equipment used to prepare raw coal for merket are discussed. Practice in analyzing coal is provided through laboratory experiments. Field trips to local preparation plants and coal laboratories are arranged to help acquaint the student with the various types of equipment used in coal preapration and analysis of coal.

214 MINING HYDRAULICS: A study of the basic principles of oil hydraulics with special emphasis given to the hydraulics characteristics of mine machinery. Mine drainage techniques are examined and the selection of pumps for forced drainage is discussed.



April 1978

School of Career Studies
Mining Program

Expansion of the staff and facilities within the mining program now have made it possible for Casper College to offer a two year program in Mining Technology. Beginning in the fall of 1978, students will be able to work toward an Associate of Applied Science Degree that may be completed in four full semesters at the College.

This program is still designed for maintenance personnel in the surface mining industry with emphasis in either electrical, mechanical or welder-machinist skills. The inclusion of safety in each of the skill areas and a selected general education provide quality career employees for mining and related companies.

The overall thrust is for a well versed helper entering the industry. The first year is spent acquiring a broad background in all three maintenance areas, as well as selected related training courses. The second year is spent in specialization in the student's chosen area.

The mining industry cooperates in this program by offering scholarships for students, generally after one semester at the college. The scholarships vary in amount but the average is $400.00 per semester.

CURRICULUM

Freshman Year

Fall Semester	Hours	Spring Semester	Hours
Applied Mathematics	3	Freshman Composition	3
Basic Electricity	4	Physical Education	1
Introduction to Mining	2	Mine Safety	2
Basic Mechanics II	4	Hydraulics	3
Metalworking	3	Industrial Prints	2
		Department Electives *	5-6

*Mechanics and welders should take Basic Mechanics I and Intermediate Welding. Electricals should take Basic Electronics II.

Sophomore Year

Mechanical Option Fall Semester	Hours
Technical Report Writing	3
Physical Education	1
General Education	3
Hydraulics/Pneumatics	3
Mechanical Systems I	2
Mechanical Systems II	2
Light Vehicle Maintenance	2
Machine Shop I	2

Mechanical Option Spring Semester	Hours
General Education	3
Elective	3
Mining Equipment	8

Welding Option Fall Semester	Hours
Technical Report Writing	3
Physical Education	1
General Education	3
Machine Shop I	2
Metallurgy I	3
TIG & MIG II	3
Pipe Welding I	3

Welding Option Spring Semester	Hours
General Education	3
Elective	3
TIG & MIG II	2
Structural Welding	3
Machine Shop II	2
Welding Seminar	1

Electrical Option Fall Semester	Hours
Technical Report Writing	3
Physical Education	1
General Education	3
Electrical Machinery	4
Power & Control	4
Computer Fundamentals	3

Electrical Option Spring Semester	Hours
General Education	3
Electronics in Industry	5
Microprocessor Fund.	4
Research Problems	2

For more information or questions on this program, you may call the following persons:

Bill Chambers, Director, Mining Technology Program - Telephone (307) 268-2501
Ted Cross, Dean, School of Career Studies - Telephone (307) 268-2536
Valgene Waugh, Secretary, School of Career Studies - Telephone (307) 268-2533

If you live in Wyoming, you may use the toll free number - 1-800-442-2963 and ask for any of the above persons.

COLLEGE OF EASTERN UTAH
PRICE, UTAH 84501
801/637/2120

ASSOCIATE DEGREE IN APPLIED SCIENCE

MINING TECHNOLOGY DEGREE

First Year	Title of Course	Credit Hours
MINE TECH.	MINING METHODS FIELD TRIP	1
MINE TECH.	COAL PRODUCTION, PREPARATION, AND USES	3
MINE TECH.	MINING METHODS	3
MINE TECH.	MANAGING THROUGH COMMUNICATIONS	3
MINE TECH.	MINE RESCUE AND FIRST AID	3
MATHEMATICS	MATH, AN EVERYDAY EXPERIENCE	3
TRADE & TECH.	TECHNICAL ALGEBRA	5
CHEMISTRY	APPLIED CHEMISTRY	5
TRADE & TECH.	GENERAL MACHANICS	3
TRADE & TECH.	PRINT READING	2
TRADE & TECH.	TECHNICAL PHYSICS	5
TRADE & TECH.	BASIC ELECTRICITY	5
HYDRAULICS	BASIC INDUSTRIAL HYDRAULICS	4
ENGLISH	VOCATIONAL/TECHNICAL WRITING	3
	TOTAL FIRST YEAR	48

Second Year		
MINE TECH.	COAL MINE LAWS OF U.S. AND UTAH	3
MINE TECH.	MINE SURVEYING	3
MINE TECH.	MINE MAPPING	3
MINE TECH.	PRINCIPLES OF ACCIDENT PREVENTION	3
MINE TECH.	MINE VENTILATION	3
MINE TECH.	SUPERVISORY TRAINING	3
MINE TECH.	MINE GASES & FIRE PROTECTION	3
MINE TECH.	LABOR/MANAGEMENT RELATIONS	3
GENERAL EDUCATION		10
ELECTIVES		17
	TOTAL SECOND YEAR	51
	TOTAL HOURS	99

MINING METHODS: Includes a study of surface and underground mining methods. Also included are economices, mining law, prospecting, exploration evaluation, and drill and blasting principles. The course is taught in conjuction with the Mining Methods Field Trip.

MINING METHODS FIELD TRIP:Inspection field trip to operating mines. A technical report is required on each visit.

COAL PRODUCTION, PREPARATION and USES: This is a study of common production methods used in coal mining, modern methods of coal preparation, working, sizing, testing, processing; and present and future uses of coal.

COAL MINING LAWS OF THE UNITED STATES AND UTAH: This course includes laws and their interpretation as applied to coal mining in Utah, with special emphasis on Title 30 of the Federal Code.

MINE SURVEYING: Includes the use of levels, transits, and other measuring instruments in underground surveying and mapping.

MINE MAPPING: The course includes the drawing of mine maps from engineering notes. Also covers ventilation maps, production maps, electrical maps, coal and surface contours and mine drawing.

MINE VENTILATION: This course studies the methods used and the problems involved in supplying the legal requirements of fresh air to the working face of a coal mine.

MINE RESCUE: Fundamentals of mine rescue techniques, wearing, operating and servicing mine rescue apparatus are covered extensively.

MINE GASES and FIRE PROTECTION: This is a study of the sources, properties, control and hazards associated with the gases that occur in the mine. Gas detection devices are examined and fire protection methods are discussed.

PRINCIPLES OF ACCIDENT PREVENTION: This course investigates the causes of accidents, the hazards associated with mine, and the principles used to prevent accidents (including State and Federal Laws affecting accidents.)

FAIRMONT STATE COLLEGE
FAIRMONT, WEST VIRGINIA 26554
304/367-4156

ASSOCIATE OF SCIENCE DEGREE

MINING TECHNOLOGY

First Semester			Credit Hours
ENG	104	WRITTEN ENGLISH	3
MATH	101	APPLIED TECH. MATH	3
PHYS SCI	100	SCIENTIFIC METHODOLOGY	2
PHYS SCI	102	CHEMISTRY	2
TEC 1		TECHNOLOGY OF SOCIETY	2
IND 1		PROCESSES (MANUFACTURING & MATERIALS)	2
DRF 1		DESIGN	2
Second Semester			
ENG	108	ADVANCED WRITTEN ENGLISH	3
MATH	102	APPLIED TECHNICAL MATH	3
PHYS SCI	104	PHYSICS	2
ELE I		ELECTRONICS	2
MAT I		MATERIALS	2
MEC I		MECHANICS	2
MIN I		ENERGY	2
Third Semester			
ENG	109	TECHNICAL REPORT WRITING	3
IND VII		PERSONNEL PROBLEMS AND LABOR RELATIONS	3
CIV I		SURVEYING I	3
MEC II		ENGINEERING MECHANICS	4
ELEC VII		AC & DC MACHINERY & CONTROLS	3
MIN II		COAL & MINING METHODS	2
Fourth Semester			
ECON	200	INTRODUCTION TO ECONOMICS	3
SAF I		SAFETY SUPERVISION	3
EDP	100	INTRODUCTION TO ELECTRONIC DATA PROCESSING	3
MIN III		COAL ANALYSIS AND PREPARATION	2
MIN IV		MINE MAPPING & VENTILATION	3
MIN V		MINE EQUIPMENT AND MAINTENANCE	3
		TOTAL HOURS	67

HAZARD COMMUNITY COLLEGE

MINING TECHNOLOGY

FIRST YEAR

First Semester:			Sem. Hr. Credit
CE/ME	105	Basic Engineering Graphics	2
ENG	101	Freshman Composition	3
ET	101	Introduction to Coal Mining and Reclamation	1
ET	100	Engineering Problems (slide rule and calculator)	1
GLY	140	General Physical Geology	4
MA	109	College Algebra or MAH 151	3
		Total First Semester	14

Second Semester:			
ET	105	Mechanics I - Statics and Strength	3
ET	151	Elements of Coal Mining	3
ET	135	Surveying I	3
ET	150	Mining Laws	3
HPR	190	First Aid & Emergency care or 5 hours Medical Training Program AMS 110	2
MA	112	College Trigonometry	2
		Total Second Semester	16

SECOND YEAR

First Semester:			
ET	275	Mine Management	3
ET	110	Electric Circuits and Components	4
ET	269	Hydraulics	4
ET	235	Surveying II or approved elective	3
ENG	102	Freshman Composition	3
		Total First Semester	17

Second Semester:			
ET	274	Mine Safety	3
ET	270	Mining Mechanics	4
ET	272	Coal Preparation	3
ET	273	Mining Economics	3
ET	263	Sampling and Analysis of Coal	4
		Total Second Semester	17

GRAND TOTAL 2-Year Program 64

7623 Elements of Reclamation

Includes discussions of theory of land reclamation with specific application to surface mining industry; basics of reforestation, and types of grasses and legumes in different geographical areas; existing federal and state regulations with theoretical possibilities of future regulations; stresses importance of production and reclamation as a working unit.

7625 Surface Mining Field Study I

Complies with policy definitions of Cooperative Education as defined in "Curriculum" section of the college catalog.

7626 Surface Mining Field Study II

Continues 7625.

7530 Surface Mine Hydraulics

Covers fundamentals of fluid power and components, including function, terminology and use of mining equipment.

7631 Elements of Spoil Management

Studies deposition of overburden, slope control, basic principles of soil control, with emphasis on principles of planning, use and effective management of varied soil materials; includes study of principles of vegetative survival through understanding of physical and chemical properties; investigates practical conservation practices.

7632 Surface Mine Equipment Operation

Studies practices and devices involved in extraction and transportation of coal, including equipment used in drainage, use of electric, hyraulic and compressed air power and coal preparation equipment and machinery.

7633 Principles of Welding

Presents practical use of oxy-acetylene and electric arc welding equipment, with students practicing cutting, bronze welding, fusion welding and hardfacing with oxy-acetylene flame.

7640 Blasting and Explosives

Includes instruction in specific details of care and use of explosives in accordance with mandated standards.

7641 Techniques of Operation Safety and Accident Prevention

Presents basic instruction for development of skills in speaking, listening and writing, including use and understanding of the Bureau of Mines Dictionary of Mines, safety films, wage agreements, forms and reports required by government agencies.

7642 Electrical Circuits and Systems

Introduces electrical principles of machine operation, including basic electricity, conductors and conductor sizes, magnetic circuits, coil polarities, and AC and DC motors.

7643 Economics and Mining and Cost Calculations

Covers fundamental economics and basic principles in business systems in everyday terminology, with emphasis on practical economics as opposed to theoretical; includes cost and pricing, competition, money systems, taxes and productivity.

7645 Surface Mining Field Study III

Provides extended practice and skill development opportunities directly related to one or more specific courses.

7646 Surface Mining Field Study IV

Continues 7645.

7650 Coal Preparation Plants

Covers purposes of coal preparation plants, including raw coal, plant processes, disposal of refuse and slurry, coal storage and loading and mechanics.

7651 Coal Sampling and Analysis

Provides basic instructions, including limited laboratory training in approved methods of analysis of coal, particularly as related to Bureau safety requirements.

7652 Labor Relations

Studies in depth development of labor and management approach to operation of mining industry, with emphasis on proper and ethical procedures involved with personnel administration.

7653 Transmission Systems, etc.

Studies applications of gears and gear drives, and mechanical advantage as related to transportation of coal.

7654 Mine Operational Planning

Studies development of effective planning as related to day-to-day and long range, specific mining operations.

7660 First Aid and Safety Management

Provides training by instruction and demonstration, with information disseminated regarding safe and unsafe practices with emphasis on reducing accidents as well as correct emergency aid for injured persons; familiarizes students with principles of mine rescue operations and actions to be taken by mine personnel.

7662 Coal Mine Supervision

Provides basic introduction to management and related obligations, including principles of motivation, employee relations and management by objectives.

7663 Water Drainage and Water Pollution Laws

Covers control of water in mining operations, including slurry ponds, pit drainage and acid seepage and study of federal EPA regulations.

MADISONVILLE COMMUNITY COLLEGE
MADISONVILLE, KENTUCKY 42431

RECLAMATION TECHNOLOGY COURSE OF STUDY

First Semester		Credit Hours
ET 030	INTRO TO COAL MINING AND RECLAMATION	1
CMS 151	COMPOSITION FOR TECHNICAL STUDENTS I OR	3
ENG 101	FRESHMAN COMPOSITION	(3)
CAR 141	INTRO TO SURVEYING AND MAPPING	3
ET 100	ENGINEERING PROBLEMS (SLIDE RULE) AND CALCULATOR	1
MA 109	ALGEBRA	3
MA 112	COLLEGE TRIGONOMETRY	2
SP 181	BASIC PUBLIC SPEAKING	3
CA 105	BASIC ENGINEERING GRAPHICS	2
Second Semester		
CHE 100	INTRODUCTORY CHEMISTRY OR	4
CHE 101	CHEMISTRY: A CULTURAL APPROACH ANI	(3)
CHE 111	GENERAL CHEMISTRY LABORATORY I	(2)
CMS 152	COMPOSITION FOR TECHNICAL STUDENTS II OR	3
ENG 102	FRESHMAN COMPOSITION	(3)
ET 125	PLAN SURVEYING I OR	3
ET 100	PLANE SURVEYING	(3)
GEN 104	AGRICULTURAL PLANT SCIENCES	4
Third Semester		
AG 187	GRASSES & LEGUMES	2
ET 280	WATER DRAINAGE AND MANAGEMENT	4
GLY 140	GENERAL PYSICAL GEOLOGY	4
ET 281	SPOIL REFORESTATION	3
ET 154	SPOIL MANAGEMENT	4
Fourth Semester		
CAR 142	FUNDAMENTALS OF AERIAL PHOTOGRAPHY	3
GLY 142	GENERAL HISTORICAL GEOLOGY	4
ET 282	ELEMENTS OF RECLAMATION	4
ET 275	MINE MANAGEMENT	3
ET 175	PRACTICUM IN RECLAMATION TECHNOLOGY	3
	TOTAL HOURS	66

MADISONVILLE COMMUNITY COLLEGE
MADISONVILLE, KENTUCKY 42431

MINING TECHNOLOGY COURSE OF STUDY

First Year

First Semester		Credit Hours
CE 105	BASIC ENGINEERING	2
ENG 101	FRESHMAN COMPOSITION (OR)	3
CMS 151	COMPOSITION FOR TECHNICAL STUDENTS	(3)
ET C30	INTRODUCTION TO COAL MINING RECLAMATION	1
ET 100	ENGINEERING PROBLEMS (SLIDE RULE) & CALCULATOR	1
ET 105	MACHANICS I - STATICS AND STRENGTH	3
GLY 140	GENERAL PHSYICAL GEOLOGY	4
MA 107	ALGEBRA	3
MA 113	TRIGONOMETRY	2
Second Semester		
CE 231	ELEMENTS OF MINING	3
ENG 102	FRESHMAN COMPOSITION OR	3
CMS 152	COMPOSITION FOR TECHNICAL STUDENTS II	(3)
ET 110	ELECTRIC CIRCUITS AND COMPONENTS I	4
ET 150	MINING LAWS	3
ET 135	SURVEYING I	3

Second Year

First Semestor		
ET 162	FUNDAMENTALS OF INDUSTRIAL ENGINEERING	3
ET 235	SURVEYING II	3
ET 270	MINING MECHANICS	5
ET 272	COAL PREPARATION	3
ET 269	HYDRAULICS	4
Second Semester		
ET 263	SAMPLING AND ANALYSIS OF COAL	4
ET 273	MINING ECONOMICS	3
ET 274	MINE SAFETY	3
ET 275	MINE MANAGEMENT	3
HPR 130	FIRST AID & EMERGENCY CARE	3
	TOTAL HOURS	68

MOUNTAIN EMPIRE COMMUNITY COLLEGE
BIG STONE CAP, VIRGINIA 24219
703/523-2400

ASSOCIATE IN APPLIED SCIENCE

MINING TECHNOLOGY

First Quarter		Credit Hours
ECON 160	SURVEY OF AMERICAN ECONOMICS	3
ENGL 111	ENGLISH COMPOSITION I	3
GENL 100	ORIENTATION	1
MATH 100	MATHEMATICAL CALCULATIONS	4
MINE 127	INTRODUCTION TO MINING AND MINE SAFETY ENG.	3
	APPROVED ELECTIVE	3

Second Quarter		
BUAD 114	PRINCIPLES OF SUPERVISION I	3
ENGL 112	ENGLISH COMPOSITION II	3
GOVT 180	AMERICAN CONSTITUTIONAL GOVERNMENT	3
MINE 128	MINE VENTILATION AND DRAINAGE	3
MINE 129	ACCIDENT PREVENTION AND FIRST AID	3
	APPROVED ELECTIVE	3

Third Quarter		
BUAD 115	PRINCIPLES OF SUPERVISION II	3
ENGL	ENGLISH ELECTIVE (1)	3
MINE 116	GEOLOGY AND ROCK MECHANICS	2
MINE 126	PRINCIPLES OF MINE RESCUE	3
PSYC 128	HUMAN RELATIONS	3
	APPROVED ELECTIVE	3

Fourth Quarter		
INDT 177	ELEMENTS OF COLLECTIVE BARGAINING	3
INDT 225	HUMAN FACTORS AND SAFETY PSYCHOLOGY	3
MINE 136	MINING HYDRAULICS	3
MINE 148	STATE MINE LAWS	3
MINE 144	MINE ELECTRICITY I	4

Fifth Quarter		
INDT 237	PREVENTIVE MAINTENANCE	3
MINE 145	MINE ELECTRICITY II	4
MINE 149	FEDERAL MINE LAWS	3
MINE 246	MINING PLANT TECHNOLOGY	3
MINE 247	MINING LAW AND MANAGEMENT	3
	TOTAL HOURS	84

MINE 116 GEOLOGY and ROCK MECHANICS : Chemistry of Geology; physical geology with emphasis on coal deposits and accompanying rock strats; rock characteristics, underground stresses, artificial mining supports, and subsidence.

MINE 126 PRINCIPLES of MINE RESCUE: The theory and application of mine rescue resulting from fires and other diasters, apparatus, organization, and procedures.

MINE 127 INTRODUCTION TO MINING and MINE SAFETY ENGINEERING: A survey course of exploration, evaluation, developement, extraction unit operations, cycling, equipment, methods, and mineral economics as related to mining; mine safety engineering with emphasis on new laws.

MINE 128 MINE VENTILATION and DRAINAGE: Mine ventilation theory and practice; elimination of waste; drainage syatems.

MINE 136 MINING HYDRALICS: Principles of fluid power, systems, and application to modern mining equipment.

MINE 137 MINE EQUIPMENT, CONTROLS, and APPLICATION: Proper operation and use of mining machinery with regards to its design to avoid misuse and abuse.

MINE 144 145 MINE ELECTRICITY I&II: Principles of electricity in both AC and DC circuits. Permissible mine machinery and legal requirements of State Division of Mines and U.S. Bureau of Mines pertaining to underground electrical work.

MINE 148 STATE MINE LAWS: An in-depth review and analysis of state mining laws, means of implementation, and implications to the mining industry.

MINE 149 FEDERAL MINE LAWS: An in-depth review and analysis of state mining laws, means of implementation, and implications to the mining industry.

MINE 156 MINE FOREMAN TRAINING: Application of state codes and practices relating to ventilation, roof control, blasting, and electricity, mine practices, rescue and recovery operations, evaluation and control of mine gasas. Preparatory work for public examination of applicants for certifiaation as a state mine foreman.

MINE 246 MINING PLANT TECHNOLOGY: Study of mine plant sysyems; methods of haulage and hoisting; machinery and equipment design requirements and selection; study of drainage systems, including pump characteristics; pipe flow and channels.

MINE 247 MINING LAW AND MANAGEMENT: Theory and practice of mine management; management-labor relations, financing, government regulations, coal marketing, economic and technological factors in effective mining operations. State, federal mining statutes, mineral-land leases.

PENNSYLVANIA STATE UNIVERSITY
215 WAGNER BUILDING
UNIVERSITY PARK, PA. 16801
814/865-4700

ASSOCIATE DEGREE

MINING TECHNOLOGY-PRODUCTION OPTION

		CREDIT HOURS
FIRST TERM		
Econ. 14	PRINCIPLES of ECONOMICS	3
Engl. 4	BASIC WRITING SKILLS; or Engl. 10 COMPOSITION and RHETORIC I	3
Math. 80†	TECHNICAL MATHEMATICS	3
Mng.T. 800	MINING TECHNOLOGY ORIENTATION	1
SECOND TERM		
Cmp. Sc. I	BASIC COMPUTER PROGRAMMING	1
E.G. I	ENGINEERING DRAWING	2
Engl. 10	COMPOSITION and RHETORIC I; or Engl.20 COMPOSITION and RHETORIC II	3
Math, 802	TECHNICAL MATHEMATICS	3
Phys. 150	TECHNICAL PHYSICS	3
THIRD TERM		
Chem. 11	INTRODUCTORY CHEMISTRY	3
E.Mch. 811	ELEMENTARY MECHANICS	3
Mng.T. 804	MINE PLANT TECHNOLOGY	3
Sp. Com. 200	EFFECTIVE SPEECH	3
FOURTH TERM		
G. Sc. 1	PHYSICAL GEOLOGY; or G. Sc. 20 OUR EARTH: or G. Sc. 30 PHYSICAL and HISTORICAL GEOLOGY	3
Min. E. (Metal) 61	INTRODUCTION to COAL PREPARATION	3
Humanities Selection		3
Social Science Elective		3
FIFTH TERM		
Mng. T. 801	COAL MINING TECHNOLOGY	3
Mng. T. 802	MINE VENTILATION	3
Mng. 30	INTRODUCTION to MINING ENGINEERING;	3
Mng. 806	MINE MANAGEMENT and LAW	3
SIXTH TERM		
Engl. 826	REPORT WRITING	3
Mng. T. 803	STRATA CONTROL	3
Mng. T. 805	MINE SYSTEMS TECHNOLOGY	3
Mng. 23	MINERAL LAND and MINE SURVEYING	3
	TOTAL HOURS	70

MAINTENANCE OPTION

			CREDIT HOURS
FIRST TERM			
Econ.	14	PRINCIPLES OF ECONOMICS	3
Engl.	4	BASIC WRITING SKILLS; or	
		Engl. 10 COMPOSITION AND RHETORIC	3
Math.	801	TECHNICAL MATHEMATICS	3
Mng.T	800	MINING TECHNOLOGY ORIENTATION	1
SECOND TERM			
Cmp.Sc.	1	BASIC COMPUTER PROGRAMMING	1
E.G.	1	ENGINEERING DRAWING	2
Engl.	10	COMPOSITION AND RHETORIC I; or	
		Engl. 20 COMPOSITION AND RHETORIC II	3
Math.	802	TECHNICAL MATHEMATICS	3
Phys.	150	TECHNICAL PHYSICS	3
THIRD TERM			
Chem,	11	INTRODUCTORY CHEMISTRY	3
E.Mch.	811	ELEMENTARY MECHANICS	3
Mng. T.	804	MINE PLANT TECHNOLOGY	3
Sp.Com.	200	EFFECTIVE SPEECH	3
FOURTH TERM			
Mng.T.	807	ELECTRICAL MINE MACHINE CIRCUITS	3
Mng.T.	810	MINE MACHINES DYNAMICS	3
		HUMANITIES SELECTION	3
		SOCIAL SCIENCE SELECTION	3
FIFTH QUARTER			
Mng.T.	801	COAL MINING TECHNOLOGY	3
Mng,T.	802	MINE VENTILATION	3
Mng.T.	808	MINE POWER DISTRIBUTION	3
Mng.T.	806	MINE MANAGEMENT AND LAW	3
SIXTH QUARTER			
Engl.	826	REPORT WRITING	3
Mng.T.	809	MINE MACHINERY HYDRAULICS	3
Mgmt.	800	PRINCIPLES OF MANAGEMENT	3
Mng.T.	811	PRACTICUM IN MINE MAINTENANCE	3
		TOTAL HOURS	70

MIN.E. 61 INTRODUCTION TO COAL PREPARATION: Theory and application of modern coal preparation practice. Sampling, crushing, sizing, gravity concentration, flotation, dewatering, drying; pollution control; flow sheets.

MNG. 23 MINERAL LAND AND MINE SURVEYING: Surveying thoery and practice applied th mineral lands and mines; traversing, leveling, mapping, shaft plumbing; stope, room, and development surveying.

MNG. 30 INTRODUCTION TO MINING ENGINEERING: Examination, development, and exploitation of mineral deposits and mines; unit operations, cycling, equipment, methods.

MNG.T 800 MINING TECHNOLOGY ORIENTATION: Films, slides, and lectures to acquaint the student with the coal mining industry and its impact on society.

MNG.T 801 COAL MINING TECHNOLOGY: Analysis of coal mining systems; integration of unit operations and mining methods for effecient mine production.

MNG.T 802 MINE VENTILATION: Quality and quanity analysis and control of mine atmosphere.

MNG.T 803 STRATA CONTROL: Fundamentals of stresses and strains in rocks; virgin and concentrated stresses; roof support, subsidence, bursts, and stability control.

MNG.T 804 MINE PLANT TECHNOLOGY: Electrical systems in mines; mechanical power applications and materials handling systems.

MNG.T 805 MINE SYSTEMS TECHNOLOGY: Quantitative methods of work measurements and their application to production and method study problems related to mines.

MNG.T 806 MINE MANAGEMENT AND LAW: The problems of the individual in coal mine management in relation to enviornment, employer, union and law.

PIKEVILLE COLLEGE
PIKEVILLE, KY. 41501
606/432-3161

ASSOCIATE OF ARTS DEGREE

MINING TECHNOLOGY

FRESHMAN

FALL SEMESTER			CREDIT HOURS
MT	100	EVOLUTION OF HEALTH AND SAFETY REGULATIONS	1
MT	101	TECHNIQUES OF SAFE MINE SUPERVISION	3
MT	103	COAL SCIENCE	3
MT	105	MATHEMATICS FOR MINING TECHNOLOGY	3
MT	110	MINE OPERATIONS AND THE LAW	3
MT	112	SAFETY AND FIRST AID	3

SPRING SEMESTER			
MT	102	TECHNIQUES OF SAFE MINE SUPERVISION	3
MT	104	COAL SCIENCE	3
MT	106	MATHEMATICS FOR MINING TECHNOLOGY	3
MT	111	MINE OPERATIONS AND THE LAW	3
MT	113	MINE RESCUE	3
MT	114	MINE MAPS	2

SOPHOMORE

FALL SEMESTER			
MT	205	MATHEMATICS FOR MINING TECHNOLOGY	3
MT	201	MINE SAFETY MANAGEMENT	3
MT	215	MINE MAPS AND RELATED ENGINEERING GRAPHICS	2
MT	200	MINE SECTION LAYOUT	3
MT	210	MINE EQUIPMENT TECHNOLOGY	4
MT	202	MINE STRUCTURES AND ROOF CONTROL	3

SPRING SEMESTER			
MT	220	COAL ANALYSIS	2
MT	212	MINE OPERATIONS AND THE LAW	6
MT	208	PREPARATION PLANT TECHNOLOGY	2
MT	206	MINE VENTILATION	2
MT	214	MINE ELECTRICITY	2
MT	222	MINE BLASTING AND EXPLOSIVES	2
MT	203	ROOF CONTROL	2

TOTAL HRS. 69

SUMMER INTERNSHIP must be taken between FRESHMAN and SOPHMORES years. 12 hrs.

MT 101 TECHNIQUES OF SAFE MINE SUPERVISION: Attention is on the development of skills in writing, speaking, and listening, including the use and understanding of The Bureau of Mines Dictionary of Mining, safety films, wage agreements, forms, and reports required by government agencies.

MT 104 Coal SCIENCE FUNDAMENTALS: Instruction is provided in the concepts of motion, matter, heat, electricity, magnetism, light, atoms, molecules, explosives, earth components, erosion, sedimentation, and ground water as significant in the extraction of coal.

MT 110 MINE OPERATIONS AND THE LAW: The student is introduced to all specific phases of the mining of coal and instructed in how these relate to the Federal Mine Health and Safety Act of 1969 and various state laws.

MT 113 MINE RESCUE: Instruction in the procedures and equipment utilized in mine rescue operations.

MT 114 MINE MAPS: Instruction in the development and reading of mine section maps.

MT 200 MINE SECTION LAYOUT: Instruction in the use of level, transit, plane table, and other equipment applicable to the development of a mine section layout.

MT 201 MINE SAFETY MANAGEMENT: Instruction in the principles of mine safety management in accordance with the course developed by the Bureau of Mines. Cost and production factors related to safety will be treated.

MT 203 ANALYSIS of MINE STRUCTURES and ROOF CONTROL: Instruction in basic principles with emphasis on specific details related to support of haulage equipment and roof control.

MT 206 MINE VENTILATION: Instruction in specific detial in installation and operation of mine ventilation equipment in accordance with mandated standards.

MT 214 MINE ELECTRICITY: Instruction in specific details for assembly and operation of mine electrical circuits and equipment in accordance with mandated standards.

MT 215 MINE MAPS and RELATED GRAPHICS: Continues Mine Tech. 214

MT 220 COAL ANALYSIS: Instruction including limited laboratory training, in the approved methods of analysis of coal, particularly as related to Bureau safety requirements.

MT 222 MINE BLASTING and EXPLOSIVES: Instruction in the specific details of the care and use of explosives in accordance with mandated standards.

SUMMER INTERNSHIP IN MINING: Students will be employed in the industry in order to secure on-the-job- experience. Each student will be required to report his experience to the rest of the group.

REND LAKE COLLEGE

MINING TECHNOLOGY
ASSOCIATE IN APPLIED SCIENCE DEGREE PROGRAM

			WEEKLY LECTURE HRS.	WEEKLY LAB. HRS.	SEM. HRS. TOTAL
FIRST SEMESTER					
MIN	1210	Introduction to Mining A1	3	0	3
ENGL	1101	Rhetoric & Composition	3	0	3
MATH	1201	Technical Math	3	0	3
AGRI	1204	Physics of Hydraulics	2	6	5
WELD	1260	Beginning Welding	1	2	2
					16
SECOND SEMESTER					
WELD	1262	Intermediate Welding	1	2	2
MIN	1240	Mechanics	1	4	3
ELEC	1230	Fundamentals of Electricity	2	2	3
MIN	1220	Mine Atmosphere & Strata Control	3	0	3
MIN	1221	Machine Operations	1	2	2
		Elective	-	-	3
					16
THIRD SEMESTER					
HEA	1102	First Aid	2	0	2
MIN	1231	Blueprint Reading	2	0	2
MIN	2245	Advanced Mechanical Maintenance	1	4	3
ELEC	2236	Electrical Maintenance & Repair	1	4	3
MIN	2256	Hydraulic Troubleshooting & Repair	2	4	4
		Elective	-	-	2
					16
FOURTH SEMESTER					
PSYCH	2201	Human Relations	3	0	3
MIN	2225	Repair & Maintenance of Preparation Plant	2	2	3
MIN	2227	Mine Health, Safety, & Rescue	5	0	5
ELEC	2237	Electrical Panels	1	4	3
		Elective	-	-	2
					16

TOTAL SEMESTER HOURS.....64

REND LAKE COLLEGE

INLAND SCHOLARSHIP PROGRAM

Rend Lake College and a major coal producer in our district presently have an educational program that is very unique and ambitious for the training and education of persons to function as coal mine repairmen.

Each group consists of eighteen students who are selected from a large pool of applicants. By having a large applicant pool to draw from, it has been found that these groups bring in many skills and habits not commonly held by the traditional community college student.

Special sections of regular college courses are arranged in special time frames for delivery to this group. Each group attends school forty hours per week for a period of thirty-nine weeks. At the end of this period, they will have accumulated all requirements of the Associate in Applied Science Degree in Mining Technology, with the exception of fourteen semester hours of credit in the general studies area. In the technical area, they will have either met or exceeded the requirements for the degree.

The students are provided with a scholarship that pays $200 per week which is furnished to the College by the coal company. The scholarship also pays the tuition, fees, and insurance for the students, as well as purchases the books and materials used in the program.

Two groups of students have finished the program and have all been employed by the sponsoring company, though employment is not guaranteed. Students from the first two groups have demonstrated exceptional skills, abilities, and attitudes as viewed by their supervisors.

COURSE OFFERINGS IN MINING TECHNOLOGY AT SHERIDAN COLLEGE

Sheridan, Wyoming

60-101	Introduction to Mining Concepts of mining, terminology, methods, practices and related subjects, fundamental to the mining industry.	3 credits
60-102	Mine Health, Safety, and Law Safe working habits, state and federal safety regulations, and state and federal mining laws	3 credits
60-105	Applied Mathematics Fundamental math concepts for the vocational-technical student in the electrical industry.	3 credits
60-106	Applied Mathematics Fundamental math concepts for the vocational-technical student in the welding industry.	3 credits
60-107	Surface Methods and Equipment Operational methods and equipment involved in surface mining, including equipment selection and scheduling.	5 credits
60-108	Underground Methods and Equipment Operational methods and equipment involved in underground mining.	3 credits
60-109	Mine Planning Fundamental elements involved in short and long-range mining planning.	3 credits
60-110	Mine Economics Concepts of engineering economics and how they relate to operations in the mining industry.	4 credits
60-111	Data Collection and Instrumentation Instrumentation and the collection, preparation and presentation of date including statistical concepts.	3 credits
60-112	Technical Writing Skills course for the student to become proficient at writing and illustrating technical information.	3 credits
60-201	Mine Surveying Basic survey concepts and equipment as applied to the mining industry.	3 credits

60-202	Fluid Power I	4 credits
	Fundamental concepts of hydraulic pressure, direction, and flow, with components involved in operation of.	
60-203	Fluid Power II	4 credits
	Testing, repair, and trouble shooting of hydraulic components.	
60-204	Basic Electricity	4 credits
	Introduction to electricity and electrical circuits.	
60-205	Motors, Generators, Transformers	4 credits
	Concepts of motion machinery and power transfer involved in electrical components.	
60-209	Mine Geology	4 credits
	Study of geological factors involved in surface mining of coal in the western United States.	
60-210	Mine Reclamation	3 credits
	Concepts involved in the reclamation of strip mined lands in the west emphasizing vegetation, water, and regulation.	
60-211	Coal Testing and Preparation	3 credits
	Elements of testing and preparation in regard to quality of coal.	
60-220	Pneumatics	4 credits
	Fundamentals of pneumatic pressure, direction, and flow, with basic components.	
60-221	Instrumentation of Fluid Power Controls	4 credits
	Basic principles of instrumentation and control of fluid power systems.	
60-222	Controls-Electrical and Fluidic	4 credits
	Control of fluid power systems by use of electrical and fluidic methods.	
53-101	Welding I	4 credits
	Basic arc welding study and practice including oxy-fuel cutting.	
53-102	Welding II	4 credits
	Advanced arc welding along with flux-cored welding, tig welding, helarc welding, and submerged arc welding.	
53-103	Metallurgy (Welding)	3 credits
	Effect study on commercial metals due to welding processed.	

53-104	Blueprint Reading for Welders and Fitters Concepts of symbols, blueprint interpretation, and bill of materials.	3 credits
53-105	Materials Evaluation Non-destructive testing of weldments.	3 credits
53-106	Pipe Welding Procedures and practice for welding of thick and thin wall pipe.	5 credits
53-107	Welding Process Skill Development Advanced skills study and practice in welding processes.	1-4 credits
53-108	Special Projects (Welding) Welding topic research and/or fabrication projects.	1-4 credits
53-109	Hobby Welding Welding sculpture or projects welding.	3 credits
53-110	Layout and Fabrication (Welding) Course for design, materials order, and fabrication of weldments.	3-6 credits

SOUTHEAST COMMUNITY COLLEGE
CUMBERLAND, KENTUCKY

RECLAMATION TECHNOLOGY

First Year

First Semester		Credit Hours
ENG 101	FRESHMAN COMPOSITION OR	3
CMS 151	COMPOSITION FOR TECHNICAL STUDENTS	(3)
CE 105	BASIC ENGINEERING GRAPHICS	2
ET 100	ENGINEERING PROBLEMS (SLIDE RULE)	1
MA 109	COLLEGE ALGEBRA	3
ET 030	INTRODUCTION TO COAL MINING AND RECLAMATION	1
CAR 141	INTRODUCTION TO SURVEYING AND MAPPING	3
SP 181	BASIC PUBLIC SPEAKING	3
Second Semester		
ENG 102	FRESHMAN COMPOSITION (ADVANCED) OR	3
CMS 152	COMPOSITION FOR TECHNICAL STUDENTS II	(3)
CE 100	PLANE SURVEYING	3
CHE 100	INTRODUCTORY CHEMISTRY	4
GEN 104	AGRICULTURAL PLANT SCIENCE	4

Second Year

AG 287	GRASSES AND LEGUMES	2
ET 154	SPOIL MANAGEMENT	4
ET 280	WATER DRAINAGE AND MANAGEMENT	4
ET 281	SPOIL REFORESTATION	3
GLY 140	GENERAL PHYSICAL GEOLOGY	4
Second Semester		
CAR 142	FUNDAMENTALS OF AERIAL PHOTOGRAPHY	3
ET 175	PRACTICUM IN RECLAMATION	3
ET 275	MINE MANAGEMENT	3
ET 282	ELEMENTS OF RECLAMATION	4
GLY 142	GENERAL HISTORICAL GEOLOGY	4
	TOTAL HOURS	64

SOUTHEAST COMMUNITY COLLEGE
CUMBERLAND, KENTUCKY

MINING TECHNOLOGY

First Year

First Semester		Credit Hours
ENG 101	FRESHMAN COMPOSITION OR	3
CMS 151	COMPOSITION FOR TECHNICAL STUDENTS I	(3)
CE 105	BASIC ENGINEERING GRAPHICS	2
ET C30	INTRODUCTION TO COAL MINING AND RECLAMATION	1
ET 100	ENGINEERING PROBLEMS	1
GLY 140	GENERAL PHYSICAL GEOLOGY	4
MAH 151	APPLIED MATHEMATICS I	3
MA 112	TRIGONOMETRY	2
Second Semester		
ENG 102	FRESHMAN COMPOSITION OR	3
CMS 152	COMPOSITION FOR TECHNICAL STUDENTS II	(3)
ET 151	ELEMENTS OF MINING	3
ET 110	ELECTRIC CIRCUITS AND COMPONENTS I	4
ET 274	MINE SAFETY	3
ET 105	MECHANICS I - STATICS AND STRENGTH	3

Second Year

First Semester		
CE 100	PLAN SURVEYING	3
ET 263	SAMPLING AND ANALYSIS OF COAL	4
ET 269	MINING HYDRAULICS	4
ET 150	MINING LAWS	3
HPR 130	FIRST AID AND EMERGENCY CARE OR	2
AHS 110	EMERGENCY MEDICAL TECHNICIAN	(5)
Second Semester		
ET 270	MINING MECHANICS	4
ET 272	COAL PREPARATION	3
ET 273	MINING ECONOMICS	3
ET 275	MINE MANAGEMENT	3
ET 235	SURVEYING II, ROUTE OR	3
	ELECTIVE	(3)
	TOTAL HOURS	64

Exhibit 5

ILLINOIS EASTERN COMMUNITY COLLEGES
District 529

WABASH VALLEY COLLEGE
OCCUPATIONAL PROGRAM
in
COAL MINING TECHNOLOGY

ONE-YEAR CERTIFICATE

		Contact Hours Per Week		
FIRST QUARTER		Class	Lab	Cr. Hrs.
CMT-112	Introduction to Coal Mining	4	0	4
CMT-122	Mining Law	6	0	6
CMS-142	Coal Mine Ventilation	4	0	4
CMS-122	Coal Mine Atmosphere	4	0	4
ORT-111	Freshman Orientation	1	0	1
	Total Hours	17	0	17
SECOND QUARTER				
CMT-152	Roof and Rib Control	4	0	4
CMT-132	Lamp & Detection Instruments	4	0	4
CMS-132	Accident Prevention & Safety	3	0	3
MTH-112	Applied Mathematics	4	0	4
	Total Hours	15	0	15
THIRD QUARTER				
CMT-142	Mining Equipment	2	4	4
DLR-132	Basic Welding	2	4	4
CMS-112	First Aid & Mine Rescue	3	0	3
CMT-162	Problems of Operating Underground Mines	4	0	4
	Total Hours	11	8	15
	Total Hours For Certificate	43	8	47

Exhibit 5

ILLINOIS EASTERN COMMUNITY COLLEGES
District 529

WABASH VALLEY COLLEGE

OCCUPATIONAL PROGRAM
in
COAL MINING TECHNOLOGY

TWO-YEAR ASSOCIATE IN APPLIED SCIENCE DEGREE

FIRST YEAR

FIRST QUARTER		Contact Hours Per Week Class	Lab	Cr. Hrs.
CMT-112	Introduction to Coal Mining	4	0	4
CMT-122	Mining Law	6	0	6
CMS-142	Coal Mine Ventilation	4	0	4
CMS-122	Coal Mine Atmosphere	2	0	2
ORT-111	Freshman Orientation	1	0	1
	Total Hours	17	0	17
SECOND QUARTER				
CMT-152	Roof and Rib Control	4	0	4
CMT-132	Lamp & Detection Instruments	4	0	4
CMS-132	Accident Prevention & Safety	3	0	3
MTH-112	Applied Mathematics	4	0	4
	Total Hours	15	0	15
THIRD QUARTER				
CMT-142	Mining Equipment	2	4	4
DLR-132	Basic Welding	2	4	4
CMS-112	First Aid & Mine Rescue	3	0	3
CMT-162	Problems of Operating Underground Mines	4	0	4
	Total Hours	11	8	15
	Total Hours First Year	43	8	47

Revised 8/2/77

ILLINOIS EASTERN COMMUNITY COLLEGES
District 529

WABASH VALLEY COLLEGE

OCCUPATIONAL PROGRAM
in
COAL MINING TECHNOLOGY

TWO-YEAR ASSOCIATE IN APPLIED SCIENCE DEGREE

SECOND YEAR

		Contact Hours Per Week		
FOURTH QUARTER		Class	Lab	Cr. Hrs.
CMT-192	Mine Hydraulics I	2	4	4
CMT-232	Mine Electrical Maintenance I	3	2	4
CMT-272	Mine Machinery Repair	3	2	4
CMT-262	Mine Conveyer Belt Maintenance	2	2	3
	Communications Elective	4	0	4
	Total Hours	14	10	19
FIFTH QUARTER				
CMT-212	Mine Hydraulics II	2	4	4
CMT-242	Mine Electrical Maintenance II	3	2	4
CMT-282	Transmission Systems & Drive Trains	2	6	5
	Humanities Elective	4	0	4
	Total Hours	11	12	17
SIXTH QUARTER				
CMT-222	Mine Hydraulics III	2	4	4
CMT-252	Mine Electrical Maintenance III	3	2	4
CMT-292	Operation of Mine Machinery	2	4	4
	Social Science Elective	4	0	4
	Elective	4	0	4
	Total Hours	15	10	20
	Total Hours Second Year	36	32	56
	Total for First Year	43	8	47
	Total for Second Year	36	32	56
	PROGRAM TOTALS	79	40	103

Revised 8/2/77

ILLINOIS EASTERN COMMUNITY COLLEGES
District 529

WABASH VALLEY COLLEGE

COAL MINING TECHNOLOGY

COURSE DESCRIPTIONS

CMT 162 PROBLEMS OF OPERATING UNDERGROUND MINES 4-0-4

This course is designed to acquaint the student with the total picture of the problems of management in the operation of a coal mine, union, management relations, grievances and contract disputes. The responsibilities and duties of management are also discussed. Four classroom hours per week.
4 quarter hours credit.

CMT 192 MINE HYDRAULICS I 2-4-4

This course is a study of the fundamentals of hydraulic pressure, direction and flow. It includes operation, maintenance, and repair of hydraulic components including reservoirs, pumps, lines, valves, motors, and cylinders. Basic testing and trouble shooting on mining equipment is covered also. Two classroom hours per week. Four laboratory hours per week.
4 quarter hours credit.

CMT 212 MINE HYDRAULICS II 2-4-4

This is a continuation of Mine Hydraulics I and includes the testing, trouble shooting, and repair of hydraulic pumps, valves, motors, etc. PREREQUISITE: CMT 192 or equivalent. Two classroom hours per week. Four laboratory hours per week.
4 quarter hours credit.

CMT 222 MINE HYDRAULICS III 2-4-4

This is a continuation of Mine Hydraulics I and II. Emphasis is placed on specific details of testing, trouble shooting, and repair of hydraulic system components. PREREQUISITE: CMT 212 or equivalent. Two classroom hours per week. Four laboratory hours per week.
4 quarter hours credit.

CMT 232 MINE ELECTRICAL MAINTENANCE I 3-2-4

This course is an introduction to electricity and electrical circuits. It includes testing, trouble shooting, basic maintenance of electrical components on mine machinery, use of common test equipment, and schematic diagrams. Three classroom hours per week. Two laboratory hours per week.
4 quarter hours credit.

Revised 8/2/77

ILLINOIS EASTERN COMMUNITY COLLEGES
District 529

WABASH VALLEY COLLEGE

COAL MINING TECHNOLOGY

COURSE DESCRIPTIONS

CMS 112 FIRST-AID & MINE RESCUE 3-0-3

Training by instruction and demonstration, information is disseminated regarding safe and unsafe practices, with a view to reducing accidents as well as teaching the correct emergency aid for injured persons. The additional purpose of this course is to familiarize the student with the principles of mine rescue operations and the actions to be taken by men underground in case of a mine disaster. Three classroom hours per week.
3 quarter hours credit.

CMS 122 COAL MINE ATMOSPHERE 2-0-2

This course is a study or analysis of mine air. Areas of study include mine air as it relates to health and safety of the men, the gases commonly encountered in coal mines and the properties of them, the fundamental physical laws pertaining to air and atmospheric pressure, and the effect of temperature and pressure on gases within a mine. Two classroom hours per week.
2 quarter hours credit.

CMS 132 ACCIDENT PREVENTION & SAFETY 3-0-3

This course is designed to teach safe working habits in coal mines. It teaches accident prevention through awareness of possible types of dangers and how to avoid them. Human behavior and personality, given as one of the major causes of mine accidents, are discussed in depth. Three classroom hours per week.
3 quarter hours credit.

CMS 142 COAL MINE VENTILATION 4-0-4

The goal of this course is to help the student understand mine ventilation control devices from the main fan to the working face. Four classroom hours per week.
4 quarter hours credit.

Revised 8/2/77

ILLINOIS EASTERN COMMUNITY COLLEGES
District 529

WABASH VALLEY COLLEGE

COAL MINING TECHNOLOGY

CMT 112 INTRODUCTION TO COAL MINING 4-0-4

This course is an introduction to the fundamental concepts of coal mining. The course will include a study of geological factors affecting coal from the origin of the earth, how coal was formed, coal resources of the United States, and the choices and methods of mining coal. Four classroom hours per week.
4 quarter hours credit.

CMT 122 MINING LAW 6-0-6

This course is an introduction to the coal mining laws of the federal and state governments. The course deals with regulations relating to mining practices, the Mining Act of Illinois covering the installation, operation and safety in bituminous coal mining, and the Federal Mine Safety Code. Six classroom hours per week.
6 quarter hours credit.

CMT 132 LAMP & DETECTION INSTRUMENTS 4-0-4

The purpose of this course is to instruct in the proper use and care of the permissible flame safety lamp and the various permissible methane detectors. Students will also learn to determine methane concentrations using these instruments and to properly maintain them, and to test mine atmospheres with the various instruments and gauges. Four classroom hours per week.
4 quarter hours credit.

CMT 142 MINING EQUIPMENT 2-4-4

This course will cover the practices and devices involved in the extraction and transportation of coal, the study of equipment used in drainage and roof support, the use of electric, hydraulic and compressed air power in coal mines, coal preparation equipment and machinery, and timbering and pinning equipment. Two classroom hours per week. Four laboratory hours per week.
4 quarter hours credit.

CMT 152 ROOF & RIB CONTROL 4-0-4

The purpose of this course is to develop a total awareness to the dangers of falls of roof, face and ribs for related mining personnel and to acquaint them with methods for preventing injuries and fatalities resulting from such danger. Four classroom hours per week.
4 quarter hours credit.

Revised 8/2/77

ILLINOIS EASTERN COMMUNITY COLLEGES
District 529

WABASH VALLEY COLLEGE

COAL MINING TECHNOLOGY

COURSE DESCRIPTIONS

CMT 242 MINE ELECTRICAL MAINTENANCE II 3-2-4

This is a continuation of Mine Electrical Maintenance I and delves deeper into the specific details for assembly and operation of mine electrical circuits and equipment in accordance with mandatory standards. PREREQUISITE: CMT 232, or equivalent. Three classroom hours per week. Two laboratory hours per week.
4 quarter hours credit.

CMT 252 MINE ELECTRICAL MAINTENANCE III 3-2-4

This is a continuation of Mine Electrical Maintenance I and II. Emphasis is placed on trouble shooting electrical circuits and conformity with mandatory safety standards. PREREQUISITE: CMT 242 or equivalent. Three classroom hours per week. Two laboratory hours per week.
4 quarter hours credit.

CMT 262 MINE CONVEYOR BELT MAINTENANCE 2-2-3

This course includes the problems involved in the maintenance and repair of belts and the proper repairs and adjustments required to keep the coal moving. It includes the principle types of conveyor lines, both belt and mechanical. The student will learn to make mechanical splices, vulcanize, install and align belts. Two classroom hours per week. Two laboratory hours per week.
3 quarter hours credit.

CMT 272 MINE MACHINERY REPAIR 3-2-4

This course covers the basic skills involved in the proper repair, maintenance and reconditioning of mine machinery. Emphasis will be on the basic mechanical construction of these machines, and will involve proper tool usage and repair procedures. Three classroom hours per week. Two laboratory hours per week.
4 quarter hours credit.

CMT 282 TRANSMISSION SYSTEMS & DRIVE TRAINS 2-6-5

This course includes the diagnosis, repair and reconditioning of the drive trains, final drives, and transmission systems used on mine equipment. Also covered are drive belt mechanisms. Two classroom hours per week. Six laboratory hours per week.
5 quarter hours credit.

Revised 8/2/77

SELF EVALUATION OUTLINE

SELF EVALUATION OUTLINE

The members of the task force would like to encourage any institution of higher education which has considered the possibility of mining training to do a careful self evaluation. Many of the schools that responded to our survey have spent large quantities of money to start and develop their mining programs. The capital investment required for mining programs clearly requires careful consideration. Below is an outline which might be helpful to an institution considering such a program.

I. Self Evaluation

   A. Examine the physical plant to determine any needs for modifications and/or expansion and the related costs

   B. Examine the financial ability to implement the coal mining training program.

   C. Examine the institution's objectives to determine the compatibility of a coal mining training program.

II. Industry Evaluation

   A. Survey service area for coal mining manpower needs

   B. Survey industry leadership for commitments of support to the institution's coal mining manpower training program

   C. Survey the willingness of government leaders, industry leaders, and union leaders to serve on a coal mining advisory council

   D. Assess manpower needs in reference to the classification and skills currently, or projected to be, in demand

III. Resources Evaluation

A. Research federal, state, and local agencies which may be of assistance

B. Study potential sources of instructors

C. Determine potential suppliers of equipment and training aids

D. Identify sources of external funds, such as CETA

IV. Develop Curriculum

A. Review manpower needs assessment

B. Prioritize all other aspects below health and safety training

C. Request advisory council review and input

V. Performance Evaluation

A. Review industry support

B. Review student statistics
   1. Completion/entry ratio
   2. Placement/completion ratio

C. Compare with other similar programs

APPENDIX I

The following material is an excerpt from "A Manual of Competency Matched Instructional Materials for Developing Coal Mining Curricula". The report was sponsored by:

State Board of Education
Illinois Office of Education
Joseph M. Cronin
State Superintendent of Education

Product One

Occupational Competencies Ranked in Order of Their Importance for Inclusion in a Secondary Level Coal Mining Curriculum (Table I)

Table I shows the listing of occupational competencies ranked in order of their importance for inclusion in a secondary level coal mining curriculum. Importance ratings were assigned by a panel of technical advisors using the following scale: 1 - Little or no importance; 2 - Of moderate importance; and 3 - Of major importance for entry-level coal mining. Competencies were also rated by the panel according to whether basic introductory instruction or in-depth instruction was needed.

The first column of Table I lists the mean importance ranking for each competency. The second column shows the mean responses to the level of instruction needed. The higher the mean, the more in-depth instruction is judged to be required.

The instrument for rating of the importance of occupational competencies was organized into two sections. Section I included knowledges and understandings which were of potential to entry-level miners and which could be learned primarily in a classroom or lab situation. Section II listed abilities or skills which in many cases required the application of knowledges and understandings of a subject to specific job tasks.

Table I. Occupational Competencies Ranked in Order of Importance for Inclusion in a Secondary Level Coal Mining Curriculum

Importance Rating*	Level of Instruction**	Competency
3.00	2.09	Able to demonstrate good attitudes and work habits such as proper care of tools and equipment, regular and punctual attendance, job motivation and initiative, etc. (II, 5)
3.00	2.33	Able to use and care for personal equipment correctly and safely. (II, 18)
2.92	2.67	Methods used in the prevention of mine fires and explosions. (I, 37)
2.92	2.67	Uses and requirements of personal mine safety equipment. (I, 43)
2.92	1.80	Able to follow oral and written directions effectively. (II, 3)
2.92	1.83	Able to work cooperatively with others. (II, 4)
2.92	2.17	Able to use instruments, hand tools, power tools, and equipment properly and safely. (II, 21)
2.92	2.50	Able to administer correct First Aid treatment in various types of medical emergencies -- accidents, fires, explosions, heart attacks, etc. (II, 16)
2.91	2.09	Able to demonstrate correct procedures for escape or self-rescue in case of mine fires or explosions. (II, 20)
2.83	2.50	Principal causes of mine fires and explosions. (I, 35)
2.83	2.09	Able to perform various types of lubrication jobs (gear box, bearings, oiling of conveyor chains, etc.) using proper lubricants and equipment. (II, 40)
2.83	2.17	Able to recognize and avoid hazards caused by unsafe mine conditions, mine machinery, electrical or other equipment, defective tools, etc. (II, 17)

* 1 = Of Little or No Importance; 3 = Of Major Importance

** 1 = Introductory Instruction; 3 = In-Depth Instruction

Table I - continued

Importance Rating	Level of Instruction	Competency
2.83	2.67	Fundamentals of First-Aid for various types of medical emergencies -- accidents, first, heart attacks, electrical shock, etc. (I, 41)
2.75	2.33	General health and safety procedures and practices in the mines. (I, 42)
2.75	2.33	Safe and proper use and care of instruments, hand tools, power tools and equipment. (I, 45)
2.75	2.17	Basic coal mining terminology. (I, 2)
2.75	2.17	Basic precedures for roof and rib control. (I, 32)
2.75	2.17	Visual and auditory cues denoting hazardous roof and rib conditions. (I, 33)
2.75	1.91	Able to demonstrate procedures and techniques which serve to prevent the occurrence of mine fires or explosions. (II, 13)
2.75	2.33	Mining laws, regulations, health and safety codes (Federal, State). (I, 12)
2.73	2.27	Local company policies, procedures, rules and regulations. (I, 13)
2.67	2.17	Appropriate methods of testing roofs and roof structures. (I, 34)
2.67	2.27	Physical principles of roof control systems for various types of roof conditions. (I, 31)
2.64	2.40	The management and labor structure of the coal mining industry (or a mining company or a typical mine). (I, 9)
2.58	2.09	Occupational and job opportunities in the coal mining industry. (I, 1)
2.58	1.91	Able to test roof using proper procedures, visual and auditory cues, testing rods or other equipment. (II, 12)
2.58	2.43	Methods of detecting mine gases and gas detection instruments. (I, 24)
2.50	2.09	Hazards and physiological effects associated with specific gases, combinations of gases, and/or deficiency of gas(es); mine damps. (I, 23)

Table I - continued

Importance Rating	Level of Instruction	Competency
2.50	2.09	Explosion hazards and safety precautions during blasting. (I, 40)
2.50	2.00	Combustibility or ability of gases to support combustion. (I, 22)
2.45	1.89	Able to demonstrate correct basic roof and rib control construction and installation practices and procedures. (II, 11)
2.42	1.36	Able to demonstrate proper fire fighting techniques for controlling mine fires. (II, 14)
2.42	1.91	UMWA and the current National Bituminous Coal Wage Agreement. (I, 10)
2.42	1.91	Types of mines (shaft, drift and slope) and their characteristics. (I, 14)
2.42	1.83	Mine ventilation maps -- symbols and definitions. (I, 28)
2.42	1.80	Physical properties of mine gases such as elasticity, weight, density, specific gravity, color, odor, taste, etc. (I, 17)
2.42	1.67	Mine ventilation systems and their components. (I, 27)
2.42	1.66	Basic terminology applying to haulage and haulageway equipment. (I, 46)
2.36	1.89	Able to demonstrate proper procedures and practices for mine rescue in various emergency situation such as fires, explosions, roof falls, etc. (II, 19)
2.33	1.18	Able to demonstrate proper safety precautions to be taken during blasting in mines. (II, 15)
2.33	2.20	Safest and most effective methods of fighting mine fires. (I, 38)
2.33	2.17	Environmental effects of coal production and use. (I, 7)
2.33	2.00	The uses of explosives and blasting procedures used in coal mining. (I, 39)
2.33	1.67	The major methods of underground and surface coal extraction, preparation and transportation. (I, 15)
2.33	1.17	Equipment, methods and practices used in the transportation of coal. (I, 47)

Table I - continued

Importance Rating	Level of Instruction	Competency
2.25	1.36	Able to construct ventilation structures such as brattice and tubing, masonry and metal stoppings and overcasts. (II, 10)
2.25	1.91	Land reclamation laws, rules and regulations. (I, 8)
2.25	2.11	Able to make minor adjustments or repairs to mining machinery and equipment. (II, 36)
2.25	1.33	The uses of coal - present and future - and the forms in which coal is used. (I, 6)
2.25	1.33	Construction and component parts of ventilation systems. (I, 30)
2.18	1.89	Functions of the major pieces of mining machinery and equipment such as: univeral cutting machine, face drill, loading machine, shuttle car, roof bolter, continuous miner, conveyor, locomotive, trolley, dump and scoop. (I, 64)
2.17	1.44	Able to recognize and take proper safety measures to escape or correct hazardous mine conditions (including mine damps) caused by gases. (II, 8)
2.17	1.89	Able to detect and identify mine gases either by their physical properties (color, taste, etc.) or by using the flame safety lamp, the permissible methane spotter, bulb-type gas detectors or other methods. (II, 7)
2.17	1.75	Chemical reactions resulting from mine fires and explosions. (I, 36)
2.17	1.80	Governmental agencies (National, State, local) that are concerned with the mining industry. (I, 11)
2.17	1.60	Velocity of air and mine resistance to an air current. (I, 29)
2.17	1.36	The technical development of the coal industry, including its impact on the U.S. and the State economy. (I, 4)
2.17	1.22	Effects of temperature and pressure on gases. (I, 18)
2.08	1.89	Fundamentals of machines used in underground mining and transportation of coal--their construction, procedures for operation and maintenance. (I, 62)
2.00	1.29	Able to maintain track and trolleys in a safe manner. (II, 24)

Table I - continued

Importance Rating	Level of Instruction	Competency
2.00	1.60	Able to read and demonstrate comprehension of technical material, maps, drawings, etc. related to coal mining activities. (II, 1)
2.00	1.44	Mine rescue training. (I, 44)
2.00	1.40	Chemical composition of air in the mines. (I, 21)
2.00	1.18	Need for and methods of water control in coal mines. (I, 61)
1.92	1.89	Atmospheric pressure and its effects on mine ventilation requirements. (I, 26)
1.92	1.50	Sampling and analysis of mine air. (I, 25)
1.91	1.50	Lubrication -- types of lubricants, lubricating equipment, lubricating charts, lubricating checks and inspections; procedures for lubrication of gear boxes, bearings, grease cups, etc.; oiling of conveyor chains; freeing of frozen rollers; packing of bearings, etc. (I, 67)
1.91	1.22	The history and growth of coal mining as an industry. (I, 3)
1.83	1.00	Able to design a ventilation system in a model mine, demonstrating ventilation structures and the use of ventilation maps. (II, 9)
1.83	1.57	Able to lay track properly. (II, 23)
1.83	2.00	Able to solve mathematics problems in coal mining activities, such as determining percentages of mine gases; calculating volume of gases, liquids, and solids; measurement of temperature, pressure, area, weight and distance, velocity of air; power calculations, etc. (II, 6)
1.83	2.00	Able to prepare a roadbed for transportation equipment used in the mining of coal. (II, 22)
1.83	2.00	Able to install, remove and/or replace mining machinery or equipment parts such as bearings, gears coupling and drive shafts, belts, etc. (II, 42)
1.83	1.50	Moisture content of air and its implications in coal mining; solubility of gases in water. (I, 20)
1.83	1.22	The geology of coal and ores (or carbon fuels). (I, 5)

Table I - continued

Importance Rating	Level of Instruction	Competency
1.75	2.00	Able to operate the major pieces of mining machinery and equipment such as universal cutting machine, face drill, loading machine, shuttle car, roof bolter, continuous miner, conveyor, locomotive, trolley, dump and scoop. (II, 35)
1.75	1.80	Able to perform arc or oxy-acetylene welding, or MIG or TIG where required for mine machinery and equipment repair, construction or maintenance of mine structures or systems. (II, 38)
1.75	1.25	Diffusion of gases (Graham's Law); occlusion and absorption. (I, 19)
1.67	1.40	Able to install, maintain, remove and/or replace electrical switches, motors, cables, lines, lights, transformers, etc. (II, 39)
1.67	1.80	Able to install, maintain or repair mechanical power transmission systems as used in underground coal mining. (II, 37)
1.67	2.00	Able to install piping for mine water removal. (II, 34)
1.67	2.00	Able to diagnose and correct mechanical malfunctions in mining machinery and equipment. (II, 41)
1.67	1.67	Applied mathematics including topics such as basic functions (addition, subtraction, multiplication, division) fractions, decimals, percentage, measurement and units of measure, ratio and proportion, area and volume. (I,16)
1.67	1.25	Hydraulic power transmission -- pipe tube and hose conductors; physical properties; friction. (I, 57)
1.64	2.00	Mechanics -- procedures for installation, operation, maintenance, repair and replacement of parts of mining machinery including bearings, oil seals, gears, coupling and drive shafts, sprockets and chains, conveyors, etc. (I, 69)
1.58	1.80	Able to diagnose and correct malfunctions in electrical components of mining machinery and equipment. (II. 26)
1.58	1.80	Able to use schematic drawings in installation, maintenance or repair of mine electrical systems, motors or components. (II, 27)
1.58	1.80	Able to install, maintain, or repair electrical power transmission systems as used in underground coal mines. (II, 28)

Table I - continued

Importance Rating	Level of Instruction	Competency
1.42	1.80	Able to apply knowledge of basic electrical theory, electrical circuits, motors, generators, controls, transformers, solid state systems, etc., to mining activities. (II, 25)
1.42	2.00	Able to install, maintain or repair hydraulic power transmission systems as used in underground coal mines. (II, 30)
1.42	1.50	Applications/uses of hydraulic power in coal mining including cylinders, valves, motors, pumps, controls and other components of a fluid power system. (I, 60)
1.42	1.00	Basic terminology, symbols and definitions pertaining to hydraulics -- hydraulic systems, fluid properties. (I, 54)
1.42	1.00	Basic principles of hydraulics (e.g., Pascal's Law); characteristics of fluids in motion; measurable pressures affecting liquid flow, etc. (I, 55)
1.36	2.00	Able to design a plan for mine water removal. (II, 32)
1.36	1.67	Graphics such as orthographics, multiviews and working drawings of mining machines and equipment (e.g., blue prints, three-view projections skeleton views, exploded views, etc.) (I, 65)
1.36	1.00	Mechanical power transmission -- functions of gears, coupling, drive shafts, belts, etc. (I, 63)
1.36	1.00	Industrial electricity -- procedures for installation, removal and/or replacement, operation of electrical switches, disconnect devices, cables, lines, lights, transformers, etc.; electric motors; power or control circuit wiring, communication systems, etc. (I, 66)
1.33	1.67	Hydraulics -- procedures for installation, operation, adjustment, repair and replacement of the hydraulic systems or components of machines used in the mining or transporting of coal. (I, 70)
1.27	1.00	Schematic drawings of electrical circuits, electrical systems, components, etc. (I, 52)
1.18	1.00	Functions and applications of electrical circuits, generators, types of electrical controls, transformers, and solid state systems in coal mining. (I, 50)

Table I - continued

Importance Rating	Level of Instruction	Competency
1.58	1.80	Able to interpret and use drawings, orthographics or multiviews as used in the construction, operation, repair or maintenance of coal mining structures, machinery or equipment. (II, 29)
1.58	1.80	Able to diagnose and correct malfunctions of mine hydraulic systems or components of coal mining machinery and equipment (i.e., cylinders, valves, pumps, controls). (II, 31)
1.58	1.80	Able to install and maintain pumps for mine water removal. (II, 33)
1.58	1.80	Mine electrical power transmission -- procedures involved in installation and maintenance of electrical power transmission systems as used in underground coal mines; application of mining laws to power transmission, safety ground systems, circuits and cable monitoring circuits. (I, 53)
1.58	1.80	Hydraulic fluids -- characteristics affecting performance of hydraulic systems; maintenance, storage and handling of hydraulic fluids. (I, 59)
1.55	3.00	Welding -- fundamental principles of welding (heliarc and oxy-acetylene, MIG and TIG, etc.) including equipment and capabilities of each type; uses in construction, maintenance or repair of mining machinery, equipment, structures or systems. (I, 68)
1.50	1.40	Able to interpret and accurately prepare written reports. (II, 2)
1.50	1.00	Function and operation of hydraulic assessory equipment such as reservoirs, accumulators, filters, boosters, instruments, heat exchangers, etc. (II, 58)
1.50	2.00	Able to diagnose and correct malfunctions of pneumatic systems or components used in the mining or transporting of coal. (II, 43)
1.50	2.00	Able to install and maintain pneumatic systems or pneumatic components of mining equipment and machinery. (II,44)
1.50	1.00	Basic electrical terms, symbols and definitions. (I, 48)
1.45	1.00	Basic electrical theory including voltage, amperage and wattage and their measurment, resistance and line drops, series and parallel circuits, alternative and direct current electricity, magnetism, etc. (I, 49)

Table I - continued

Importance Rating	Level of Instruction	Competency
1.18	1.00	Fundamental principles of contruction and operation of electric motors as components of mining machinery and equipment. (I, 51)
1.17	1.00	Hydraulic application of mechanics in fluid power; 1) work, pressure, acceleration, energy; 2) inertia, power, efficiency. (I, 56)
1.08	1.00	Pneumatics -- procedures for installation, operation, maintenance, repair and replacement of pneumatic systems or pneumatic components of machinery used in the mining or transporting of coal. (I, 71)

Table I contains competencies from both Section I and Section II of the rating instrument. In the parentheses following each competency statement, the Section and the number of the competency (as it was listed on the rating instrument) are given. The fact that both types of competencies are included in Table I accounts for the apparent similarity between certain statements. For instance, competency statement number 4 of Section I concerns the knowledge and understanding of the fundamentals of First Aid for various medical emergencies. Competency statement number 16 of Section II involves the ability to administer correct First Aid treatment in various types of medical emergencies - i.e., the demonstration or practical application of a skill involving the earlier knowledges and understandings. All Abilities/Skills statements from Section II can be identified by the introductory phrase 'Able to . . .' .

As a starting point for curriculum planning, Table I presents a number of competencies deemed important for inclusion in a secondary level coal mining curriculum. A discussion of the further use of the competency statements in the planning of a coal mining curriculum is presented in the Procedures for Use section of this report.

Findings and Implications for Curriculum Planning

In order to facilitate understanding of the findings for the purposes of curriculum planning, the competencies are presented in three groupings: those rated as being 1) of major importance, 2) of moderate importance, and 3) of little or no importance for inclusion in secondary level coal mining curricula. The groupings were made by ranking the means of the importance ratings assigned to each competency by the technical advisors. Competencies with mean importance ratings falling within one of the three specific ranges are grouped together. Those competencies whose mean ratings were in a range

from 2.50 to 3.00 were considered "Of Major Importance" and those competencies whose mean ratings ranged from 2.00 to 2.49 were considered "Of Moderate Importance" to entry-level miners. Competencies which received a mean rating of less than 2.00 were considered as being "Of Little or No Importance" for entry-level miners.

Examination of Table I indicates that competencies considered to be of major importance for entry-level miners include: 1) job supportive skills or attributes such as good work habits, attitudes, cooperation, etc.; 2) safety, including avoidance or prevention of accidents and proper reaction and response in case of emergencies; 3) proper and safe use and care of personal equipment and tools; 4) ability to perform various types of lubrication jobs; 5) understanding of basic coal mining terminology; 6) roof and rib control; 7) mining laws, rules and regulations at the Federal, State and local (or company) levels; 8) the management/labor structure of the coal mining industry, including job opportunities; and 9) mine gases, their identification, detection and associated hazards.

Competencies felt to be of moderate importance to entry-level miners include those involving: 1) mine ventilation, including mine maps; 2) technical development, methods, and economic impact of coal mining; 3) transportation (haulage) of coal; 4) minor adjustments or repairs to mining machinery and equipment; and 5) fundamentals and functions of major pieces of mining machinery and equipment.

Competencies judged as being of little or no importance for inclusion in secondary level coal mining curricula for entry-level miners include: 1) operation of major pieces of mining machinery and equipment; 2) basic terminology and principles of electricity, hydraulics mechanics, and pneumatics; 3) use or understanding of graphics, schematics, etc., in the

installation, repair, or maintenance of equipment and machinery; 4) diagnosis and correction of malfunctions in machinery and equipment; 5) welding; 6) installation and maintenance of pumps, etc. These competencies require complex skills, machinery and equipment-intensive training and/or long periods of training and experience. In addition to the high skill levels and training required, jobs involving these skills are not generally available to entry-level miners because of the occupational structure outlined by union regulations.

Competencies of Major Importance for Entry-Level Coal Miner Training at the Secondary Level. Analysis of the occupational competencies rated as most important has interesting implications for curriculum development. In the estimation of respondents knowledgeable of coal mining and coal miner training programs, qualities such as good attitudes and work habits, ability to follow directions, cooperation with others, and proper and safe use of tools and equipment take precedence for entry-level miners over more specific knowledges and job skills. Rather than being a body of factual or cognitive information necessary for the performance of job duties and activities specific to the coal industry, these highly valued qualities are general employability skills underlying the ability of a student to function as an employee. The development of these important qualities may be encouraged and fostered 1) by the personal example of the instructor, 2) by the constant emphasis of the instructor upon the vital and sometimes critical nature of these qualities in the mining environment, and 3) by the insistence of the instructor that students exhibit good work habits, follow instructions, and practice care and safety with all tools and equipment in classroom/lab and shop activities.

The subject of safety is particularly important to coal miners and

can be presented as an integral component of the coal mining curricula. Of twenty competencies that involve safety, thirteen received ratings "Of Major Importance" and seven received ratings "Of Moderate Importance" for entry-level miners. General overall safety procedures and practices in the mine can be taught as a separate unit of instruction; and specific aspects of safety which apply to each topic or unit of instruction can be integrated into the curriculum. The importance ratings emphasize the competencies involving the prevention of accidents through instruction in 1) the recognition and avoidance of hazards, 2) the major causes of accidents or emergencies in coal mining, 3) proper and safe use of tools, machinery, and equipment, and 4) the observance of Federal, State and local safety codes and regulations.

In addition to the teaching of prevention or avoidance of accidents or emergencies, emphasis was given to the importance of proper reaction and response in case emergencies or accidents do occur. Knowledge of correct First Aid treatment and the ability to administer it effectively are both very important to entry-level miners. If the training is given by a certified Red Cross instructor, a First Aid Certificate is awarded on completion of the course. This certificate, if presented to a coal mine employer within twelve months of the training period, is proof of the fulfillment of the mandated requirement for First Aid training.

Entry-level miners were felt to need instruction in the proper use of personal safety equipment, procedures for escape or self-rescue in case of mine fires, explosions, or other emergencies, and techniques for fighting different classes of mine fires, e.g., electrical, flammable liquids, etc. This instruction requires at least a minimum of actual personal coal mining safety equipment, mine maps for teaching of escapeways and airflow, materials

for constructing a barricade, and if possible, several types of fire extinguishers for teaching fire fighting of the different kinds of fires.

Using and caring for personal equipment, instruments, hand and power tools properly and safely was considered one of the highest priorities for entry-level miners. Training in the use and care of self-rescue equipment is vital to the individual's safety in case of mine emergencies, and careful use and maintenance of instruments, hand and power tools can help to avoid accidents or prevent injuries both to the miner and his/her co-workers.[1] Use of the wrong tool for the job and carelessness in leaving tools or equipment in the wrong place have caused numerous accidents and injuries to coal miners. It is important that special care be taken in the use of delicate instruments and hand or power tools. Mistreated instruments can give faulty readings, and poorly maintained or incorrectly used hand or power tools are potentially dangerous to the miner.

Entry-level miners are considered to need the ability to perform various types of lubrication jobs. The proper lubrication of mining machinery and equipment is an integral part of an overall preventive maintenance program. The coal mining environment with its problems of coal dust, rock dust, moisture and periods of intensive equipment use makes imperative a system of proper periodic lubrication in order to help avoid costly mechanical breakdowns and work stoppages.

Knowledge and understanding of basic coal mining terminology is a vital competency for entry-level miners. In order to be responsive to directions from supervisors, knowledgeable concerning their jobs, and safe workers, it is necessary that entry-level miners have an understanding of those terms which are basic and in some cases exclusive to the coal mining industry.

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[1]The hiring of both males and females as entry-level miners is mandated by federal law, and training programs are open to both sexes in coal mining states such as Kentucky, Pennsylvania and West Virginia.

The basic terminology of coal mining can be taught during an orientation portion of the coal mining curriculum, or specific terms concerning each unit of instruction (e.g., coal mine ventilation, mine gases, roof and rib control, etc.), can be introduced along with the relevant instructional material.

Another grouping of competencies considered important for entry-level miners concerns those involving roof and rib control. Knowledge of basic roof and rib control systems, the ability to detect hazardous roof and rib conditions, appropriate methods of testing roof and roof structures, and correct basic roof and rib control construction and installation procedures and practices are included in this topical group. Perhaps the reason for the high importance ratings assigned roof and rib control is the sobering statistic that falling roof and ribs kill more miners each year than any other single type of accident.[2]

Entry-level mining students in a classroom setting can be taught the importance of a correct roof and rib support system, the types and appearance of potentially dangerous roof faults (e.g., cracks, cleavage planes, kettle bottoms, etc.) and the proper methods, tools and procedures for testing and scaling of roof and ribs. The actual detection of hazardous roof and rib conditions through the time-honored sight, sound and vibration method can only be learned in an actual mine by experience, careful observation and judgment. Experience and judgment are based on knowledge of the characteristics of the roof of a particular coal mine and how it acts when exposed at various steps in the mining process.

It is of major importance for entry-level miners to be familiar with Federal and State mining laws, regulations and health and safety codes. A

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[2]U.S. Bureau of Mines Instruction Guide 17, Roof and Rib Control, p.12.

great number of these laws, regulations and codes were developed in order to make mines and the mining process safer and healthier for the worker. Ignorance of the law or disregard of it is a serious matter and can bring about work stoppages or in some cases the closing of the mine.

Local company policies, procedures, rules and regulations were also indicated as being knowledges for entry-level miners to acquire. Classroom training of mining students can make them aware of the types of local company information they should learn, e.g., supervisory line of authority, procedures for mine transportation and communication, the mine check-in and check-out system, mine escapeways and emergency evacuation procedures, information concerning payroll, annual and sick leave, causes for discharge, grievance procedures, etc. After the students are employed, they will receive federally mandated training in the specific policies and procedures applicable to the mines in which they will be working.

Knowledge of the management and labor structure of the coal mining industry, and occupational and job opportunities in coal mining is ranked as being of consequence for entry-level miners. These types of information lend themselves well to classroom instruction, and their presentation could be enhanced by having individuals such as a coal mine superintendent, a UMWA official, and a mine personnel director speak to the mining students on the particular topic relating to their work in the industry.

Competencies which are closely tied in to the subject of safety, but which are considered of concern in their own right, include those pertaining to mine gases--their identification and detection, the hazards and physiological effects of specific gases, their physical properties, and their combustibility or ability to support combustion. An abnormal (gas) condition can occur underground in a number of ways. Interruption of the ventilation air, sudden outbursts of gases from pockets between layers of coal

or other strata, excessive mining rates, fires, and explosions can all precipitate dangerous gassy conditions. It is important that miners know emergency procedures to follow depending upon the gas(es) involved in order to prevent injury or the loss of life. Equally important, if not more so, is the need for miners to know preventive measures in order to avoid emergencies involving mine gases. Basic understandings of the characteristics of gases and the effects of temperature and pressure on mine gases can be vital to the prevention of those emergencies involving abnormal gassy conditions.

Competencies of Moderate Importance for Entry-level Coal Miner Training at the Secondary Level. The closely associated competencies concerning mine gases, the knowledges and understandings of mine ventilation systems and their components, mine ventilation maps, including their symbols and definitions, and the ability to construct mine ventilation structures were deemed of moderate importance for entry-level miners. In addition to a study of the dangers of mine gases, the purposes of mine ventilation in removing harmful mine gases and bringing fresh air into the mine are emphasized. Practice mine ventilation maps, a table-top mine model (which could be made by mining students), materials such as framing lumber, brattice cloth, and cement blocks for construction of masonry stoppings, etc., would be helpful in the teaching of these competencies.

A background of general knowledge concerning coal mining including its technical development, the major types of coal mines, methods of underground and surface coal extraction, preparation and transportation, and the impact of coal mining on the U.S. and State economies is considered moderately important for entry-level miners. Similar importance ratings were assigned knowledges of the uses of coal (present and future), the environmental ef-

facts of coal production and use, and land reclamation laws, rules, and regulations. Instruction involving these kinds of information on coal mining would be greatly enhanced by field trips to different types of mines, preparation plants, and sites reflecting well-planned reclamation procedures and practices.

Entry-level miners would benefit from a familiarity with mining machinery and equipment. It is very unlikely that mining programs at the secondary level would have access to their own mining machinery or equipment unless it was donated to them by a mining company. However, through photographs, printed materials and audio-visual aids, mining students can learn a considerable amount about mining machinery and equipment. This is one instance where a cooperative relationship with local mining companies, perhaps encouraged by their inclusion on a mining Curriculum Advisory Committee might make possible field trips to nearby mines for above-ground observation of equipment and machinery.

Knowledge of the basic terminology, equipment, methods, and practices used in the transportation of coal is included among those competencies of moderate importance. Transportation methods might vary considerably from mine to mine according to the type of mine, its size and the company owning the mine. Mining students can become familiar with types of coal haulage used by mines in the areas in which they intend to seek employment. The ability to maintain track for the transportation of coal was also considered to be moderately important.

The competency involving knowledge of the need for and methods of water control in mines is regarded as being of moderate importance for entry-level miners. Students can learn both the sources of mine water and the methods and equipment used in its removal.

Competencies of Little or No Importance for Coal Miner Training at the Secondary Level. Many competencies included in the survey instrument received mean importance ratings of less than 1.99 (Of Little or No Importance for entry-level miners). Of interest to secondary level coal mining curriculum planners is the fact that, for the most part, the competencies receiving ratings of little or no importance to entry-level coal miners are those involving the more complex skills, extremely expensive equipment and machinery, and long periods of training and experience. These included the operation and maintenance of major pieces of mining machinery, installation of electrical, mechanical or hydraulic systems or components, diagnosis and correction of malfunctions in equipment or machinery, etc. In some cases the training must come through apprenticeship or instruction by a highly skilled or certified master craftsman (such as in the case of an electrician). Other skills are mining-machinery specific and require that the student have access to those pieces of machinery or equipment involved in the competencies relating to their operation, maintenance or repair. These high-level skills are vitally important to the mining industry, but entry-level miners do not need these complex skills and, in fact, are excluded from those jobs involving such skills by the classification of jobs in the Bituminous Coal Wage Agreement of 1978.

In contrast to those competencies rating of little or no importance for entry-level miners, the competencies ranking highest in importance for secondary level coal mining curricula require instruction involving more easily taught basic skills, knowledges and understandings, the use of a minimum of coal mining-specific equipment, and relatively shorter periods of training. These competencies lend themselves to large group instruction in